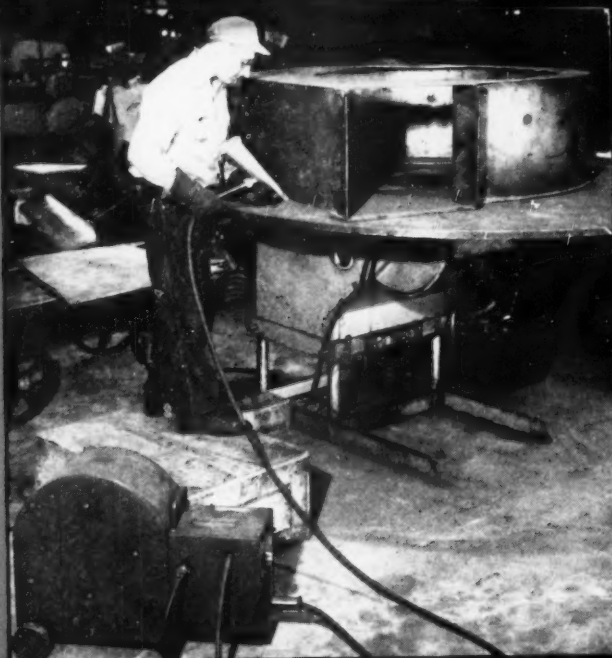


*Machine
and Tool*



BLUE BOOK

ESTABLISHED 1906



**Safety Fixture for
PNEUMATIC CHUCKS**

NOVEMBER 1953

**Automatic Welding Cuts Costs
of Fan and Blower Elements**

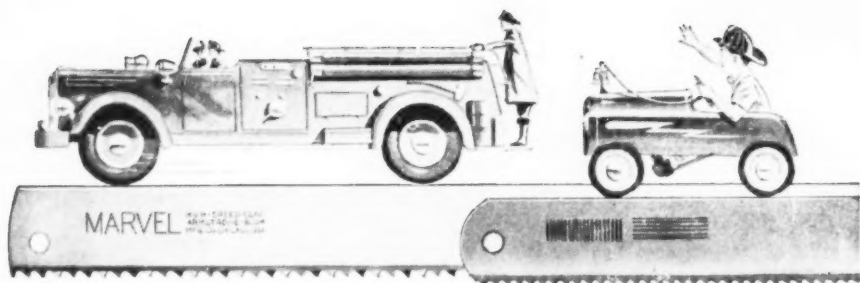
Feeding Short Strip Stock

A Summary of New Materials

Last Minute Washington News

"Know-How" Reference Sheets

CONTENTS ON PAGE 5



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When—and if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

Adapt Any Milling Machine For POWER ROTARY MILLING

KNIGHT'S *Power Feed* ROTARY TABLES



- Completely Self-Contained Motor Driven Units
- No Set-Up Time — No Special Equipment
- Just Plug Into Nearest Electric Outlet

Especially designed for fast, precision Cycle Milling and Indexing—Continuous Face Milling—Cam Milling—Other special purpose jobs that require an Automatic Revolving Fixture. An exceptional time and labor saver!

20" MODEL: 18 quick-feed changes, 1½" to 52", or 3" to 108"

42" MODEL: Infinite variable feed. Table can be increased to 72" with sub-plates.



*Mail Coupon
For Brochure*

W. B. KNIGHT MACHINERY CO.
3924 WEST PINE BLVD., ST. LOUIS 8, MO.

ATTACH TO COMPANY LETTERHEAD

W. B. KNIGHT MACHINERY CO.
3924 W. Pine Blvd., St. Louis 8, Mo.

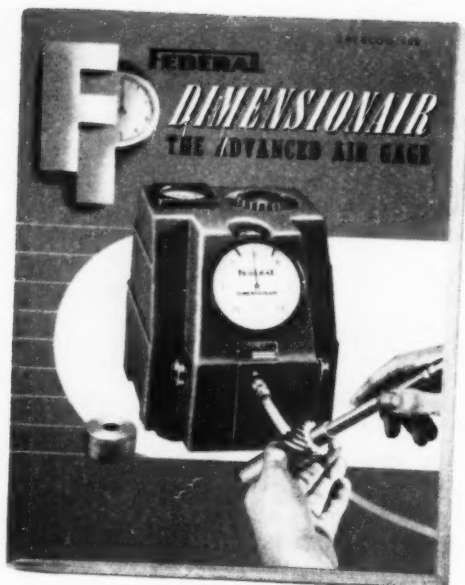
Send information on Power-Feed Rotary Tables

NAME

TITLE

☐ Also send details on Knight Milling Machines

READ 
 ALL 
 ABOUT 
 THE 
 LATEST 
 IN **AIR GAGING**



JUST OFF THE PRESS, this book contains up-to-the-minute, complete specifications for the Dimensionair. It explains the important advantages of the new balanced air system. It also tells about our entirely new air gage accessories — The Arnold Air Gage, Air Electric Switch, and Air Gaging Electronic Controls. You will also find useful tables showing plug, ring, and air snap sizes available from stock. Here, conveniently available in one attractive catalog, is a fund of the latest authoritative reference data on the Air Gage, developed by Federal during many years' study of actual shop use requirements and engineering research. Ask for your copy today and profit from this valuable new book. FEDERAL PRODUCTS CORPORATION, 2511 Eddy St., Providence 1, R. I.



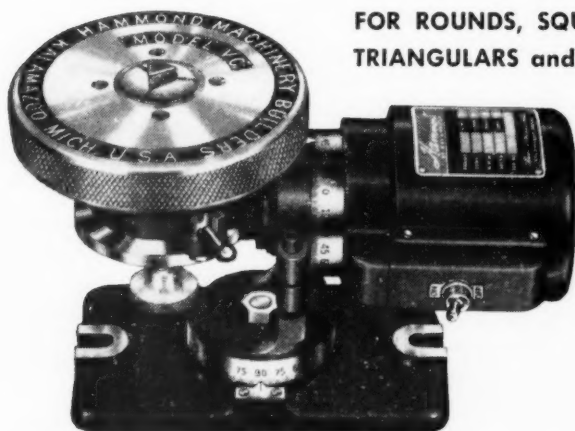
FEDERAL

Largest manufacturer devoted exclusively
 to designing and manufacturing all types
 of DIMENSIONAL INDICATING GAGES

Hammond OF KALAMAZOO
GOOD MACHINERY SINCE '82

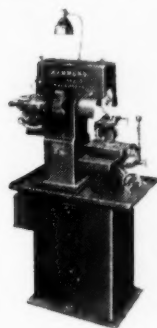
FAST ACCURATE GRINDING of SOLID CARBIDE INSERT TOOLS

FOR ROUNDS, SQUARES,
TRIANGULARS and RECTANGULARS



MODEL VC, Style M Motorized Solid Carbide Insert Grinding Fixture. Style H, without motor also available. Write for Bulletin No. 235.

THE Hammond Solid Carbide Insert Grinding Fixture pays for itself in a few weeks. Offers a fast, economical and accurate means of grinding chip breaker grooves in round, square, triangular and rectangular shapes and for rough and finish grinding of dull and damaged carbide inserts. Motorized Style M with lug base can be mounted on most tool and surface grinders and Hammond CB-76, CB-77 and CB-77W Chip Breaker Grinders.



HAMMOND MODEL CB-77 CHIP BREAKER AND DIAMOND FINISHING GRINDER can be supplied with both the standard Any Angle Vise and the Model VC Solid Carbide Insert Grinding Fixture.

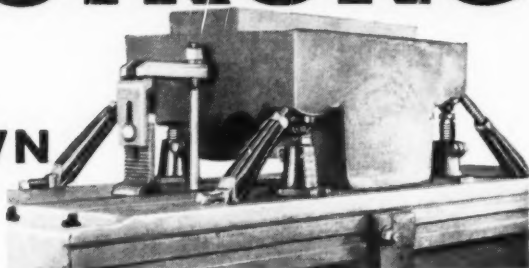
BUILDERS OF AMERICA'S MOST COMPLETE
LINE OF CARBIDE TOOL GRINDERS

Hammond Machinery Builders
INC

1614 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

ARMSTRONG

SET-UP and HOLD-DOWN TOOLS



**PLANER
JACKS**



**NON-SKID
JACKS**



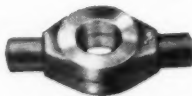
**STEP
BLOCK**



UNIVERSAL CLAMP



T-SLOT BOLTS AND NUTS



STRAP CLAMPS

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents.

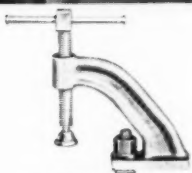
Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 W. Armstrong Ave., Chicago 30, U. S. A.



T-SLOT CLAMP



Machine Tool BLUE BOOK Contents for NOVEMBER 1953 VOL. 21

Featured in this Issue	135	How's Business?	149
As the Editor Sees It	137	Letters to the Editor	154
Last Minute Washington News	141	Special Report on Grinding Machines ..	245
BLUE BOOK's "Know-How" REFERENCE SHEETS			203

FEATURED ARTICLES

Feeding Short Strip Stock to be Formed, Extruded, and Embossed Through a Progressive Die	157
By Paul Prikos	
Which Grade Of Carbide Should You Use?	162
By Guy Monacelli	
Safety Plan For Pneumatic Chucks	177
By James Joseph	
Automatic Welding Cuts Costs of Fan and Blower Elements	185
Quick-Acting Nest Type Drill Jig	194
By Tom Brown	
Flame Plating Protects Parts From Wear	209
Which New Material Shall I Use? A Summary of Recent Developments	217
By Julius J. Harwood	
Get Your Money's Worth Out of Those Meetings	235
By Edmund Mottershead	
Special Report on Grinding Machines	245

MODERN TOOLS IN ACTION

50% Time Saved With Copymatic	276
Tungsten Carbide Ratchets Help Reduce Saw Production Costs	277
Metallizing Replaces Brazing in Repair of Knitting Machine Shafts	278
Automatic Machine for Connecting Rods	282

SHOP HINTS

Gadgets Can Save Money	283
Sharpening Pliers	283
How To Turn Tubing	283
Gage Checks Parallelism	284
Reduces Paint Loss	285
Sack Salvages Diamonds	285
Double-Pointed Height Gage	286
Coolant Reaches the Cutting Edge	286
Suggestion for Drilling Straighter Holes	288

DEPARTMENTS

News of the Industry	291	Mechanics Through the Ages	426
Available Literature	328	Products Index	428
What's New in Metalworking	343	Index to Advertisers	434
The Market Place	424		

EDITORIAL STAFF

Wm. F. Schleicher, editor; M. Bryan Baker, associate editor; E. McDaniel, associate editor; Arnold Kruckman, Washington editor; Paul Prikos, vice-president, Prikos & Becker Tool Co., consultant tool and die editor; Howard F. Smiley, director of research.

EDITORIAL ADVISORY BOARD

Homer F. Griffith, asst. works mgr., Ind. Power Div., International Harvester Co.; Roger Fardig, superintendent, B. F. Gump Co.; Ronnie Burritt, asst. factory mgr., Chicago Screw Co.; Harry Conn, chief engineer, Scully-Jones & Co.; Paul Prikos, vice-president, Prikos & Becker Tool Co.; J. V. Carlson, Gen. Supt., Union Special Machine Co.

BUSINESS STAFF

R. C. Van Kampen, president; Vincent C. Hogren, vice-president; J. E. Hitchcock, vice-president; M. L. Yonts, secretary and production manager; Herbert I. Sterling, circulation manager; Robert Mackay, art director.

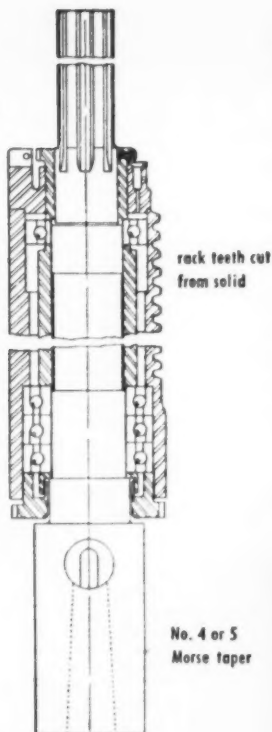
Hitchcock Managers are Listed on Page 64

Accepted under section 34.64, P.L.&R.,
Authorized Office, Chicago, Ill.

Copyrighted, 1953 by the Hitchcock Publishing
Co., 222 E. Willow Avenue, Wheaton, Illinois



multiple splines



rack teeth cut
from solid

preloaded
precision
ball bearings

hardened
tang slot

No. 4 or 5
Morse taper

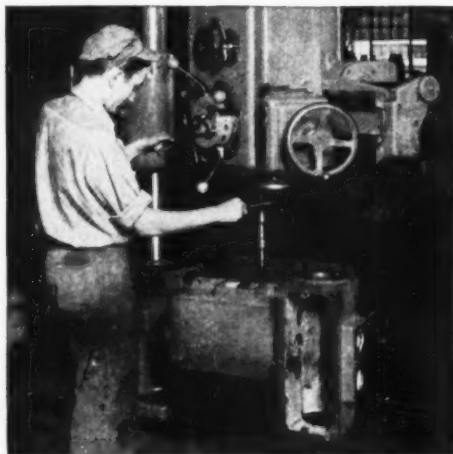
In the photo at the right the operator drills and taps a total of 35 holes, on five faces of the casting, by using a Cincinnati Gilbert Universal Table.

RADIALS
HORIZONTAL BORING MILLS
ACCESSORIES

ACCURATE

Job after job, Cincinnati Gilbert spindles stay right on "O". The $4\frac{1}{4}$ " OD alloy steel quill has a 12" long bearing in the head; spindle is mounted in the quill with three ABEC No. 5 precision, preloaded angular contact ball bearings at the bottom and one at the top. The Gilbert spindle gives maximum accuracy even under strains of improperly sharpened drills, uneven depths of cut, as well as normal thrust load of feeding . . . For sustained accuracy, make your next radial a Cincinnati Gilbert. Write for Bulletin 349.

FLEXIBLE



THE CINCINNATI
GILBERT

MACHINE TOOL COMPANY

3366 BEEKMAN ST. • CINCINNATI 23, OHIO

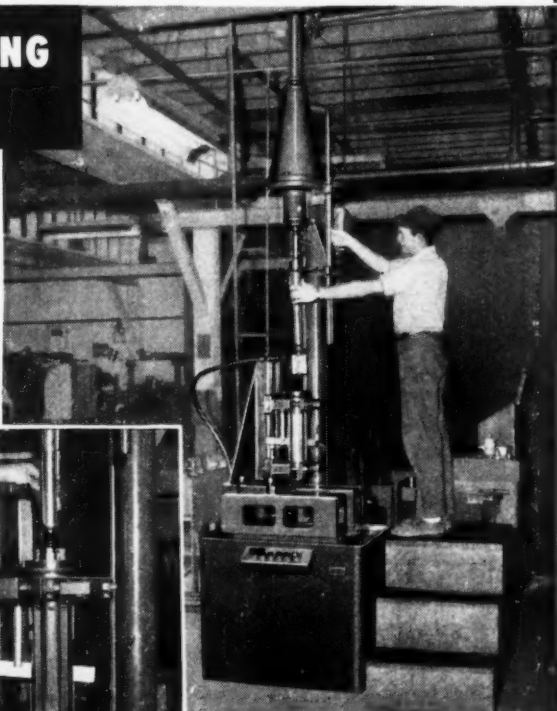
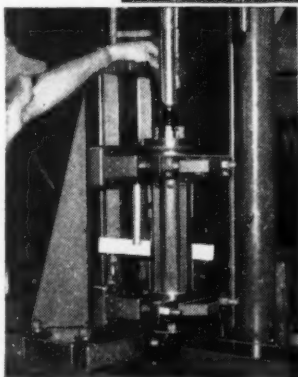
THOSE WHO BUY GILBERT BUY GILBERT AGAIN

**ONLY TWO EASY STEPS . . . BOTH
AMAZINGLY SWIFT AND EFFICIENT**
for fast precision finishing

FULMER HONING MACHINES

1. Honing stones **SHEAR** off the protuberances from the internal bores . . . then
2. **FINISH** the internal surfaces to geometric accuracy so rapidly that as much as 1/16 inch is removed from the diameter at a rate of 1½ to 2 cu. inches or more per minute

Fulmer Honing Machines speed cutting and finishing and insure dimensional accuracy to tolerance of .0001 ÷ in every internal honing operation for ferrous and non-ferrous metals, plastics, glass, etc.



Photograph shows Fayscott Corporation of Dexter, Maine, honing spindle sleeves for Giddings & Lewis boring mills.

C. ALLEN FULMER CO.

Write for
bulletin on
honoring

1242 FIRST NATIONAL BANK BLDG.

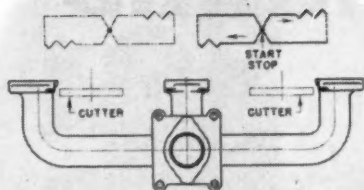
CINCINNATI 2, OHIO

Replacing the overarm with a two-spindle head

REDUCES COST OF MILLING



CINCINNATI

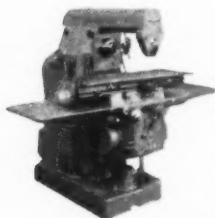


OPERATION ON MANIFOLD

Drawing of part and diagram of automatic cycle.

production data

Part name Intake manifold
 Material Cast iron
 Operation Mill flanges for stud washers
 Depth of cut..... $\frac{1}{8}$ "
 Cutters $4\frac{1}{2}$ " diameter, inserted blade, sintered carbide
 Production 125 per hour
 Machine CINCINNATI No. 1-18 Plain Automatic Milling Machine



CINCINNATI No. 1-18 Plain Automatic Milling Machine. Catalog No. M-1555-2 containing complete specifications will be sent on request.

Multiple spindle milling machines usually save time by milling two or more parts simultaneously. In this example, only one part is milled at a time. However, there are four surfaces and they are milled in pairs. Cincinnati Application Engineers assigned the job to a CINCINNATI No. 1-18 Plain Automatic Milling Machine. A two-spindle head, driven by the machine, is mounted in the over-arm dovetail bearing at the top of the column. A manually operated fixture and two $4\frac{1}{2}$ " diameter sintered carbide cutters complete the equipment. This machine, with very little tooling, mills the flanges on manifolds at the rate of 125 per hour. Cincinnati No. 1-18 Plain Automatic Milling Machines offer several advantages for work of this type:

- (a) Automatic backlash eliminator for down-milling operations, or alternately up and down milling.
- (b) Automatic spindle stop protects the operator.
- (c) Fast automatic table cycles, with 300" per min. rapid traverse.

Other advantages for production milling operations within a 3 hp range are outlined in Sweet's Catalog File for Mechanical Industries. Complete data may be obtained by writing for catalog No. M-1555-2.

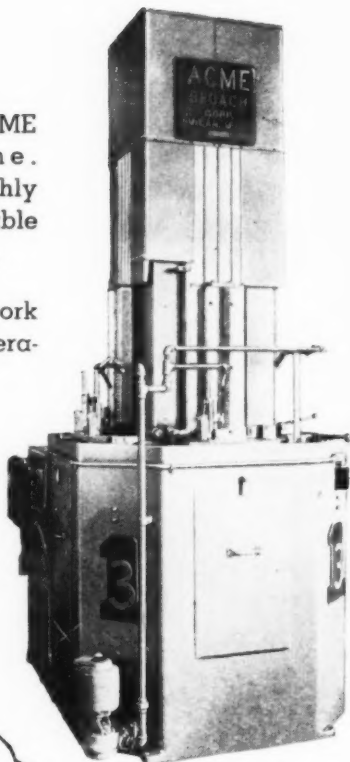
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

DESIGNEERED*

Versatility is predominate in the ACME Model U-31 Broaching Machine. Designeered* to fill the need for a highly universal broaching machine it is suitable for either surface or internal broaching.

One, two or three operators may work simultaneously and like or different operations may be done at each of the three work stations. In production plants progressive operations are often carried on moving the part from station to station. In the job shop each station may be tooled for a different operation and run as required eliminating changeover.

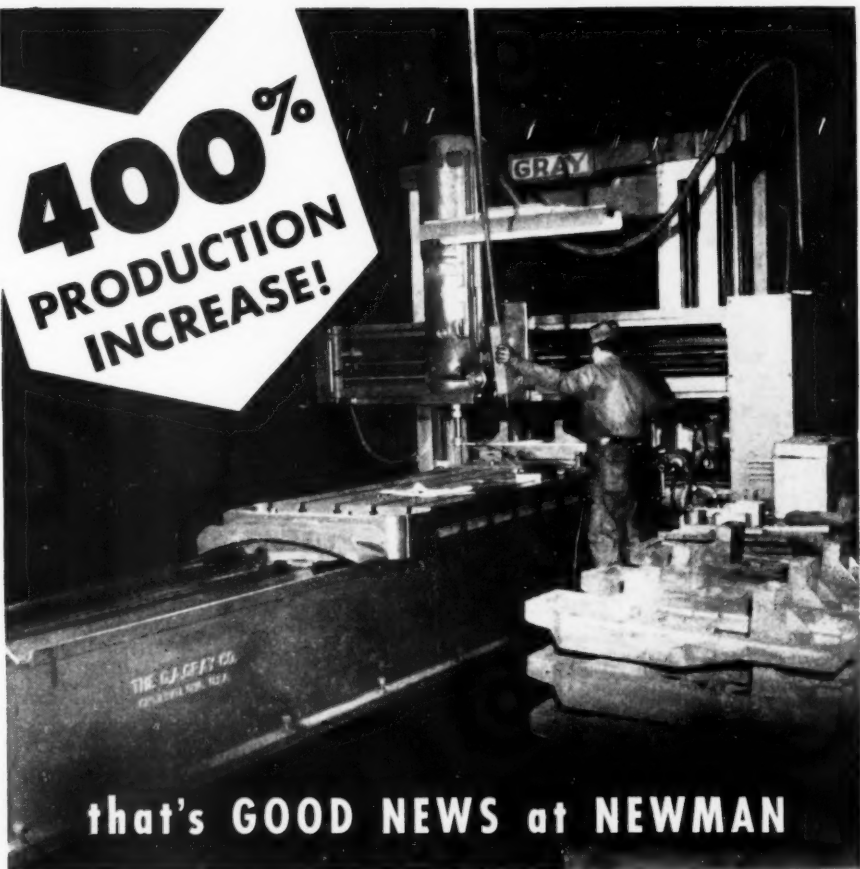


* **DESIGNEERED** ... An ABC word coined to describe the creative design-engineering inherent in every product made by Acme Broach Corp.

Shown above is ACME model U-31, 40" stroke machine. Write today for further information. No obligation, of course.

ACME BROACH CORP.
MILAN, MICHIGAN

**400%
PRODUCTION
INCREASE!**



that's GOOD NEWS at NEWMAN



Write today. Get
the story on GRAY

**HIGH
low cost
PRODUCTION**

GRAY is paying off at Newman Machine Co., Inc., Greensboro, N. C.
A new GRAY 48" x 48" x 16' Milling Machine is on the job. GRAY's unit
head versatility, great operating convenience, and high precision performance
slashed milling time to 1/4 . . . increased production 400%.
Further proof that a GRAY in your shop will look just as good
to your Treasurer as to your Superintendent.

The G.A. **GRAY** *Company*

planers • milling planers
planer type milling machines
horizontal boring machines

Dept. D

CINCINNATI 7, OHIO U.S.A.

SOLD IN CANADA BY UPTON, BRADEN AND JAMES, LTD. • SOLD IN LATIN AMERICA BY MACHINE AFFILIATES

Users report excellent results with New Sunicut S Oils

In just six months, these unique new straight cutting oils have "Job Proved" themselves as top performers in many metalworking shops all through the industry.

From the field, reports like these keep coming in:

LARGE IMPLEMENT MANUFACTURER TELLS US, "We get better finishes in our broaching operations with Sunicut 110-S, and our operators favor its light color."

SCREW MACHINE SHOPS REPORT, "The versatility of Sunicut 209-S permits us to reduce the number of oils we must stock."

AN AUTO PARTS MANUFACTURER INFORMS US, "Threaded parts are as much as 50° cooler when they come off the machines. And our operators like the clear, clean, odorless qualities of Sunicut 102-S."

BROWN & SHARPE SCREW MACHINE OPERATORS SAY, "Sunicut 11-S increases tool life, gives finer finishes, eliminates staining problem."

Let us show you how these new Sunicut S Oils can help you. For technical bulletins or the services of a Sun representative, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Department MT-11.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA. SUN OIL COMPANY LTD., TORONTO & MONTREAL





3 way control is "EXTRA" in *Jarvis*

CONTROL 1

is in production—constant improvements in methods and procedures make Jarvis Power Tools the finest that can be produced.

CONTROL 2 is in distribution—Jarvis field men are trained specialists—men who can help you with YOUR problems—men who will give you reliable recommendations.

CONTROL 3 is in service—from start through to delivery, your order receives thorough attention and follow-through.

Use this "3 Way Control" to assure yourself of the best in power tools—JARVIS.

THE CHARLES L. JARVIS CO.
MIDDLETOWN IN CONNECTICUT

TUNGSTEN CARBIDE TOOLS

Ground-from-the-solid

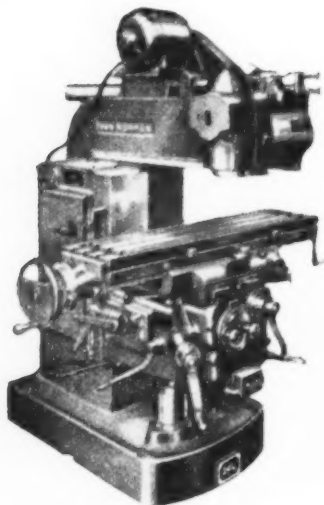
Send for FREE catalog.

JARVIS POWER TOOLS

TAPPING ATTACHMENTS
TAPS • FLEXIBLE SHAFTS
AND MACHINES • ROTARY
FILES • TUNGSTEN CARBIDE
REAMERS AND MILLS
DRILLS • BORING BITS

*Announcing
4 Completely New...*

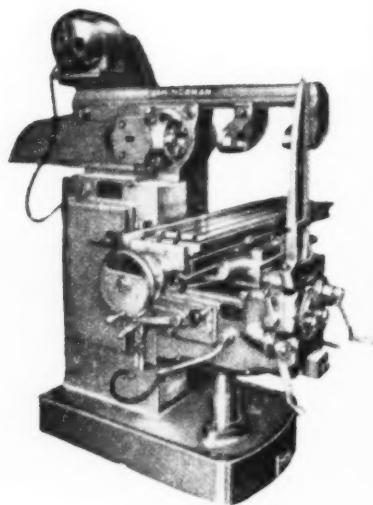
VAN



No. 24 L

Cutterhead in
Vertical Position
Table: 45" x 10½"
Ram Travel: 29"

9 Speeds: 50 to 1400 R.P.M.
Spindle Motor: 3 H.P.
Feed Motor: 1 H.P.
Approximate Weight: 3700 lbs.



No. 24 M

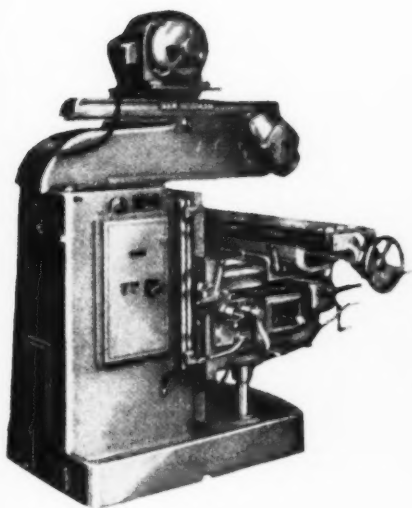
Cutterhead in
Horizontal Position
Table: 50" x 12"
Ram Travel: 25"

12 Speeds: 40 to 1600 R.P.M.
Spindle Motor: 5 H.P.
Feed Motor: 1 H.P.
Approximate Weight: 4000 lbs.

VAN NORMAN COMPANY, SPRINGFIELD 7,

NORMAN Ram Type Millers

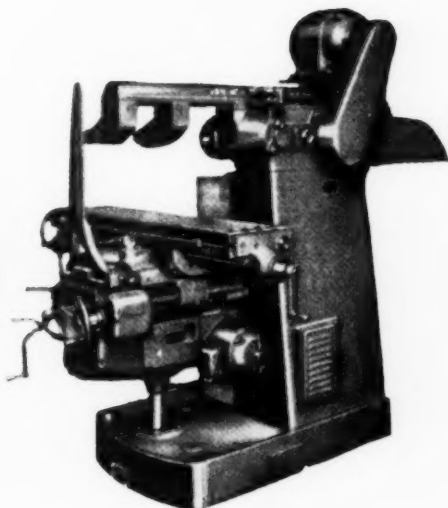
Each Designed to Provide Greater Versatility, Cut Milling Costs:



No. 28

Cutterhead in
Angular Position
Table: 58" x 13"
Ram Travel: 29"

12 Speeds: 40 to 1600 R.P.M.
Spindle Motor: 7½ H.P.
Feed Motor: 1½ H.P.
Approximate Weight: 6300 lbs.



No. 38 M

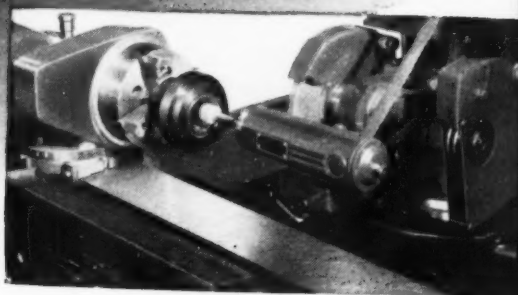
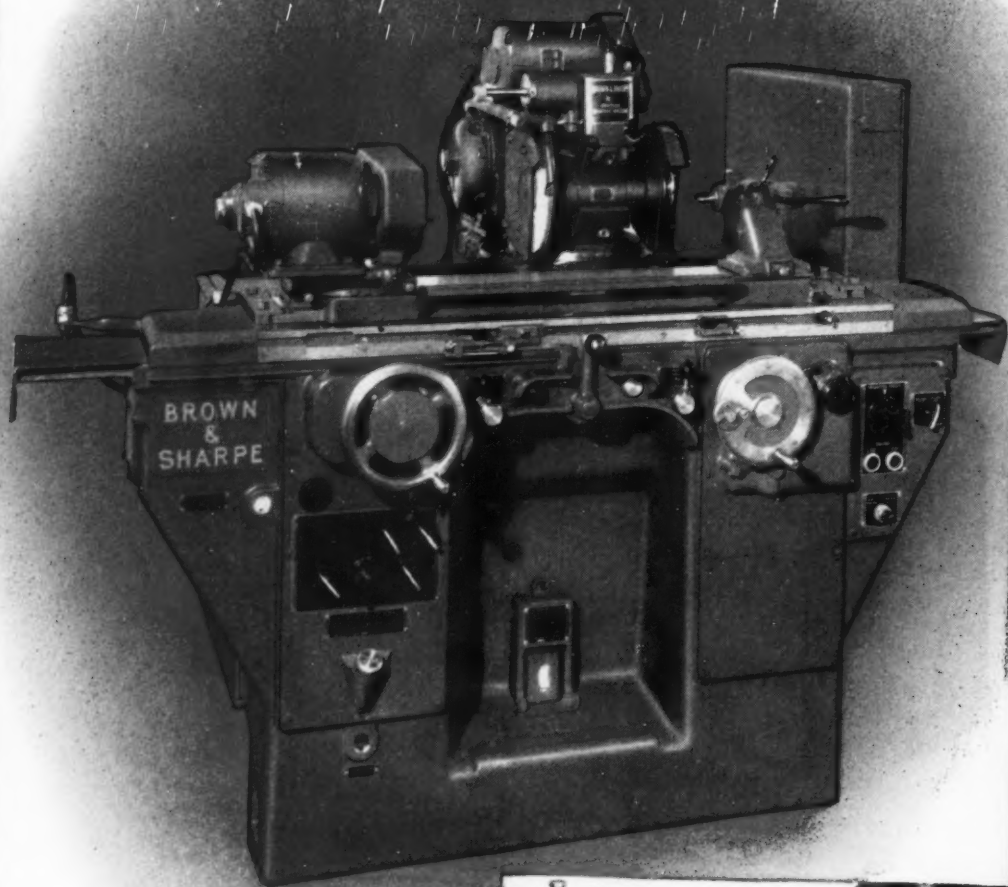
Cutterhead in
Horizontal Position
Table: 64" x 14"
Ram Travel: 29"

12 Speeds: 35 to 1400 R.P.M.
Spindle Motor: 7½ H.P.
Feed Motor: 1½ H.P.
Approximate Weight: 7200 lbs.

These new Van Norman Millers feature the famous adjustable cutterhead which permits conventional horizontal and vertical as well as angular milling on one machine. They have been completely designed and engineered to provide utmost accuracy plus long operating life. Write for complete information.



**New in concept
New in versatility, too...**



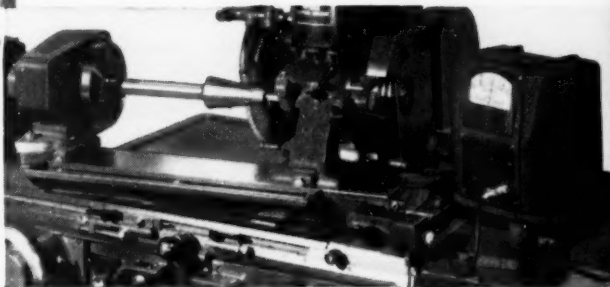
4 Completely New Universal Grinding Machines

Combination Shoulder and Straight Grinding. Note wheel is mounted on right end of spindle. Continuous In-Feed Arrangement (optional) assures smooth accurate finish on shoulder face. When straight grinding, wheel can be fed automatically on each or alternate reversals. Separate dwell controls assure "grind-out" at shoulder without delaying reversal at other end of work.



Taper Grinding. Extremely accurate taper is established by the Electra-Lign (optional). Minute adjustments of swivel table are indicated directly on the amplifier dial.

Internal Grinding a straight and tapered hole in one set-up. Table travel is used to grind straight portion, and cross feed is used to grind taper. Internal spindle nestles into the wheel spindle head when not in use.



GRINDING CAPACITIES

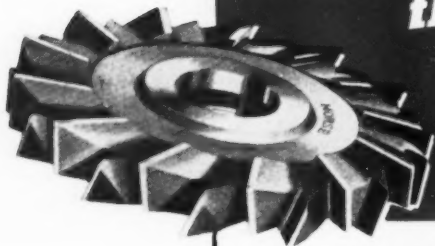
Size	Swing	Centers take	
		Nom.	Max.
1*	10"	20"	22 3/4"
2	14"	30"	33 3/4"
3	14"	40"	43 3/4"
4	14"	60"	63 3/4"

*No. 1 machine illustrated

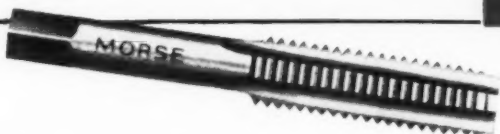


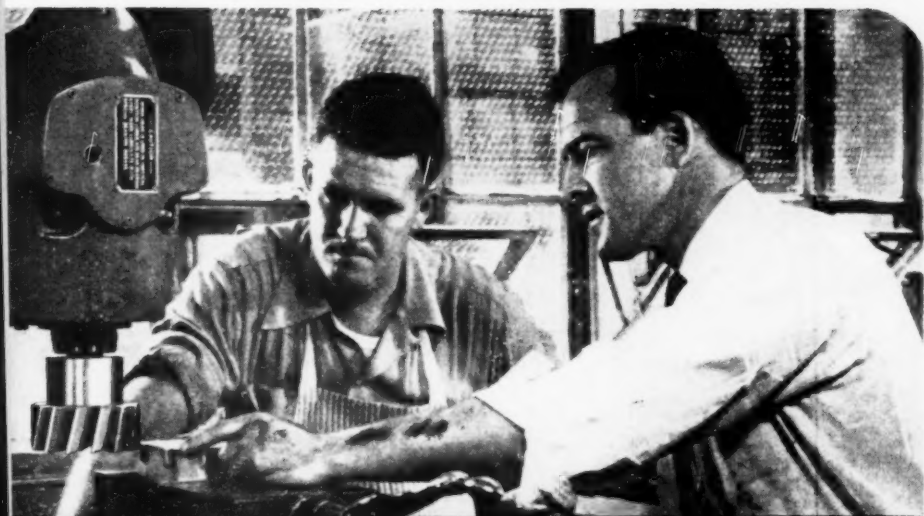
Brown & Sharpe

**He never cares
how black his white
collar gets — when
there's a job
to be done
for you!**



... Your Morse-





Franchised Distributor

He's an everyday working man, your Morse-Franchised Distributor. He pitches in with your own men, right up to the elbows, when there's a cutting tool problem to be licked. Remember he has the hard-earned experience to do it . . . backed by the tool industry's finest engineering staff and the confidence that comes

of his knowledge that back of him is a *complete line of the world's finest cutting tools.*

So when you are faced with a tough problem involving cutting tools, send for your Morse-Franchised Distributor. He'll take it off your hands, and clean it up fast and right! *Call him today.*

MORSE TWIST DRILL & MACHINE COMPANY, NEW BEDFORD, MASSACHUSETTS

(Division of VAN NORMAN CO.) • Warehouses in New York, Chicago, Detroit, Houston, San Francisco

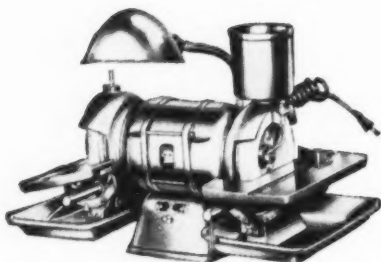
MORSE

Cutting Tools

*Buy them by phone
from your Morse-Franchised
Distributor and save
ordering time*

Baldor

**BALL-
BEARING** **HEAVY-DUTY
GRINDERS**



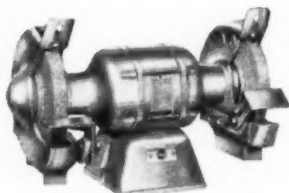
Clip this ad and mail for bulletins on Carbide Tool and other BALDOR Grinders

NEW BALDOR W-I-D-E CLEARANCE GRINDER

Baldor is a basic manufacturer of Grinders—even the motors are built by Baldor. The new streamlined grinder, 8200 series, is excellent for grinding long and odd-shaped pieces as there's plenty of clearance between the wheels and the motor frame. ½ hp, 3450 RPM, capacitor-start, capacitor-run motor **GUARANTEED 2 years** against burnout. Baldor makes a complete line of 6"-12" general purpose bench and pedestal grinders. Complete as shown **\$89.50** at right.

CARBIDE TOOL GRINDER FOR PRECISION WORK

The ½ hp motor that powers this Baldor Carbide tool Grinder has no commutator, no centrifugal switch, no brushes—a really trouble-free motor that will not burn out even when overloaded repeatedly. Electronically balanced within 1/50 ounce of perfection, the armature rotates at 3450 RPM without vibration—an engineering achievement that makes true precision work possible. Complete as **\$149.20** shown at left.



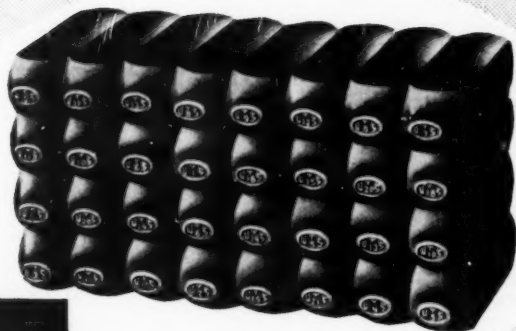
Note exhaust type guards.

Ask For BALDOR
GRINDER BULLETIN 321-H

BALDOR ELECTRIC COMPANY

4368 Duncan Avenue

St. Louis 10, Missouri



RETAIN CONTROL

with INSPECTION and CODE STAMPS



These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

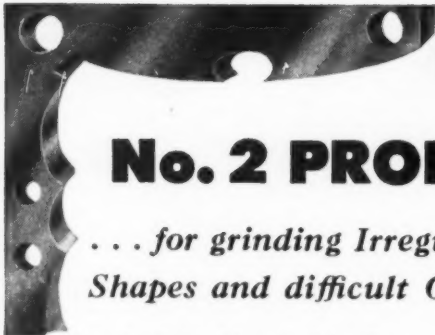
"IF IT'S WORTH MAKING, IT'S WORTH MARKING"

Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.



GEO. T. SCHMIDT, INC.

1802 Belle Plaine Ave. Chicago 13, Ill.



Boyar-Schultz

No. 2 PROFILE GRINDER

*... for grinding Irregular
Shapes and difficult Contours*

A standard machine tool in die shops and in tool rooms where grinding odd shapes and difficult, irregular contours is necessary.

It is a particularly useful machine for grinding and fitting large dies and punches such as forming dies for refrigerators, table tops, sanitary ware and in automotive and aircraft shops.

Spindles in dual spindle model illustrated, turn at 10,000 RPM; stock removal is rapid even with small diameter wheels. Uses wheels $\frac{1}{4}$ " to 3" in diameter.

No. 1 Profile Grinder

A bench model with spindle speed of 20,000 RPM. Performs in minutes, many jobs that would ordinarily require hours. Uses wheels $\frac{1}{8}$ " to 1" diameter.



BOYAR-SCHULTZ
C o r p o r a t i o n

2108 WALNUT STREET, CHICAGO 12, ILL

WRITE
FOR LITERATURE
FULLY DE-
SCRIBING THESE
TIME SAVING
MACHINE TOOLS

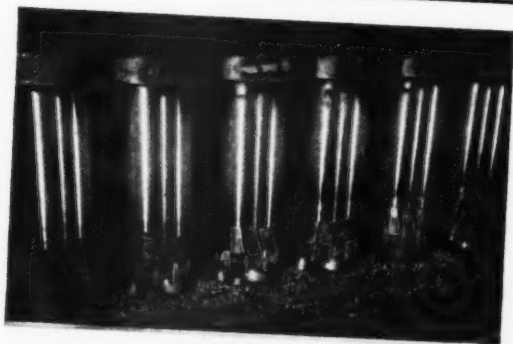
OUNCES
OF



WESSONMETAL

CEMENTED CARBIDE!

TONS OF PRODUCTION!



ACTUAL JOB

Farm Implement Mfg. Co.

Machine..... Ingersoll Boring Mill—6 spindle
Part..... Cylinder block
Operation..... Rough cylinder bore
Tools..... 3 R.H. and 3 L.H. Wesson Fine
Pitch Cutters—3.480 dia.—
12 Wessonmetal Solid G1 Blades
Speed..... 148 S.F.M.
Stock Removal..... 3/16"
Feed..... 10" per min.—.063 per revolution
Length of Cut..... 8 7/8"

OVER 300% DOLLAR SAVINGS PER TOOL

OLD METHOD

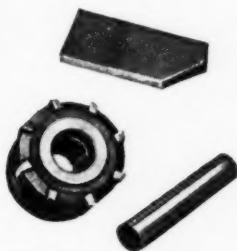
Pieces per Grind..... 836
Cost of Tool..... \$49.68
Grinding Cost
per sharpening..... \$11.70
Tool Cost per 100 Pieces.. \$2.588

NEW WESSON METHOD

Pieces per Grind..... 3160
Cost of Tool..... \$172.80
Grinding Cost
per Sharpening..... \$8.78
Tool Cost per 100 Pieces.. \$0.642

On only one machine with Wesson Tools Savings of over \$900 per year

HOW IS YOUR PRODUCTION SCORE CARD!



Write today for folder
on Wesson's
educational, full color,
sound movie—
"This Carbide Age."

WESSONMETAL
Cemented Carbide

WESSON METAL CORPORATION

LEXINGTON, KENTUCKY

Affiliated with WESSON COMPANY, Detroit, Mich.

IT'S NEW! It's Powerful!
It's Low Priced!

STONE Model M-35

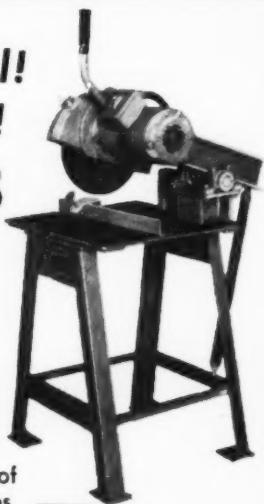
12" Cut-Off Machine

For Ferrous and Non-Ferrous Metals

CAPACITY

Ferrous—1½" solids,
2½" O.D. pipe, 2½" structurals
Non-ferrous—2½" solids,
3" tubing and extrusions

We are proud to present the newest member of our superior line of high speed cut-off machines. The M-35 has a full 3½ h.p. geared-in-head motor. The direct drive insures delivery of full power to the cutting edge. Result — faster cutting (3 seconds per square inch of metal) and greater wheel life.

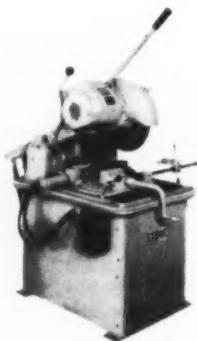


PRICE

Completely Equipped
Ready for Cutting

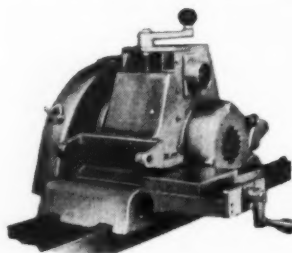
\$445

F.O.B. Syracuse, N. Y.



MODEL M-75

Full 7½ h.p. geared-in-head motor. Will cut all ferrous and non-ferrous solids up to 2½" pipe and structurals up to 4". Can be equipped for wet cutting.

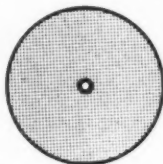


MODEL SS-20

Operates on guided rails for cutting larger structural steel, plate, sheets, with cuts up to nine feet in length. Cuts wet or dry.

STONE ABRASIVE WHEELS

Cut 25% faster — average cutting time is 3 seconds per square inch of metal. Increased wheel life up to 25%. Write for prices.

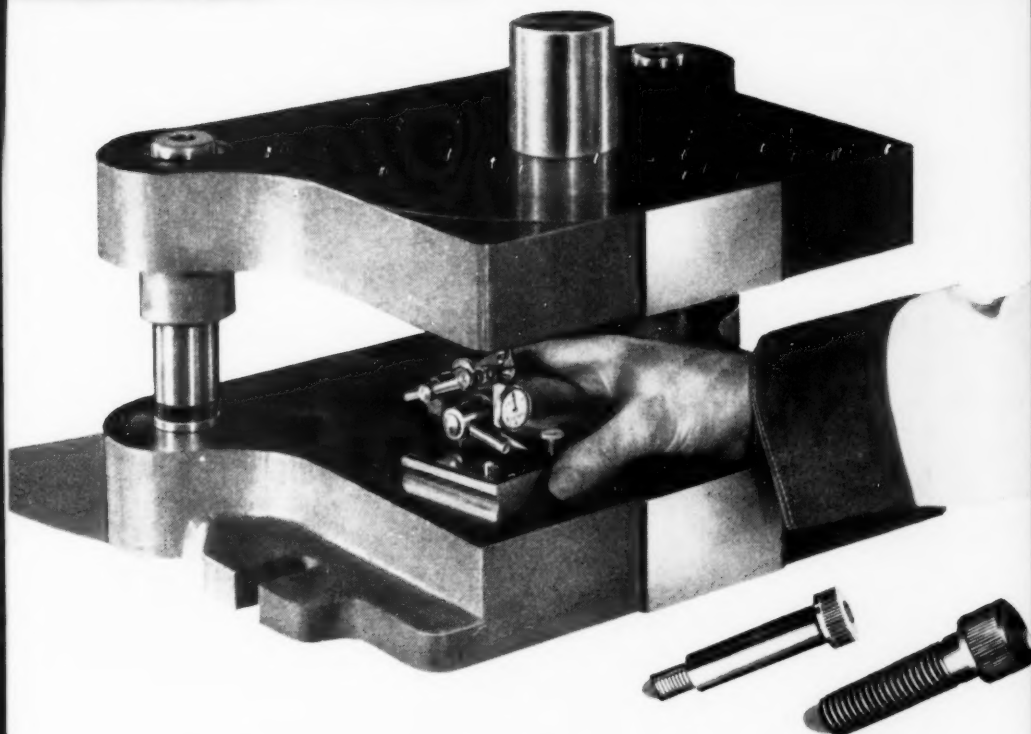


For complete information write to

STONE MACHINERY Co., Inc.

404 Fayette St.

Manlius, N. Y.



DIEMAKERS DEPEND ON DANLY FOR DIE SET ACCURACY

Diemakers everywhere *depend on Danly Die Sets and Danly Diemakers' Supplies* for accuracy. Precision machining, grinding, lapping and honing provide smooth, long-wearing surfaces with dimensional accuracy held within extremely close tolerances.

Danly accuracy saves countless hours in the die shop, makes tooling-up much faster, insures longer production runs at lower cost. Why not bring Danly into your diemaking plans and get the results you're looking for.



Call Your Local Danly Branch Today!

***CHICAGO 50** 2100 S. Laramie Ave.

***CLEVELAND 14** 1550 East 33rd St.

***DAYTON 7** 3196 Delphos Ave.

***DETROIT 16** 1549 Temple Ave.

***GRAND RAPIDS**

113 Michigan St., N.W.

INDIANAPOLIS 4 5 West 10th St.

***LONG ISLAND CITY** 47-28 37th St.

***LOS ANGELES 54** Ducommun Metals

& Supply Co., 4890 South Alameda

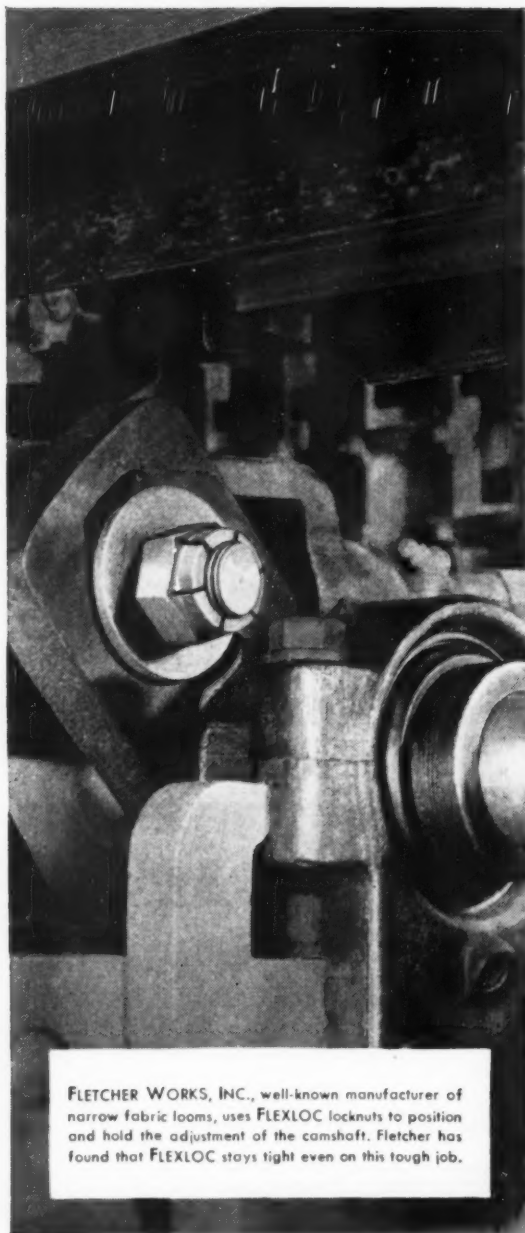
MILWAUKEE 2 111 E. Wisconsin Ave.

***PHILADELPHIA 40**

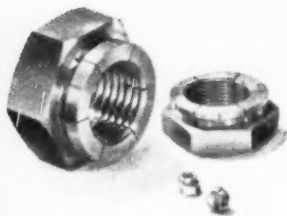
511 W. Courtland St.

***ROCHESTER 6** 33 Rutter St.

**Indicates complete stock*



FLETCHER WORKS, INC., well-known manufacturer of narrow fabric looms, uses FLEXLOC locknuts to position and hold the adjustment of the camshaft. Fletcher has found that FLEXLOC stays tight even on this tough job.



How FLEXLOC locknuts reduce breakdowns

FLEXLOCS reduce breakdowns by staying put. Once installed, you can forget them.

FLEXLOCS eliminate complicated, time-consuming methods of locking threaded fasteners. They offer simpler application, more dependable locking than plain nuts and lockwashers, castle nuts and cotter pins, or nuts and jam nuts.

Use FLEXLOCS in place of ordinary nuts. These one piece, all metal locknuts won't work loose. Yet they can be used again and again. FLEXLOCS are stop nuts too. They stay put anywhere on a bolt as soon as their locking threads are fully engaged.

You can get FLEXLOCS in a wide range of sizes in any quantity. Stocked by leading industrial distributors. Write for literature and samples for test purposes. SPS, Jenkintown 52. Pa.

FLEXLOC

LOCKNUT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

Our Fiftieth Year: A START FOR THE FUTURE

New

PRATT & WHITNEY

MODEL G

AIR-O-LIMIT

COMPARATOR



Outstanding Features:

- High magnification (10,000 to 1). Each division equals .00001 inch.
- Large dial for fast, easy reading.
- 8" length scale, with linear graduations through 180 degrees.
- High degree of repeatability.
- Fast, "dead beat" pointer action.
- Standard gaging plugs with normal diametral clearance. Maximum wear life, reduced cost.

*First Choice
for Accuracy*



MACHINE TOOLS
CUTTING TOOLS
GAGES

PRATT & WHITNEY

DIVISION NILES — BEMENT — POND COMPANY
22 Charter Oak Blvd., WEST HARTFORD 1, CONN.

Please send me complete information about the new
Model G Air-O-Limit Comparator.

NAME _____

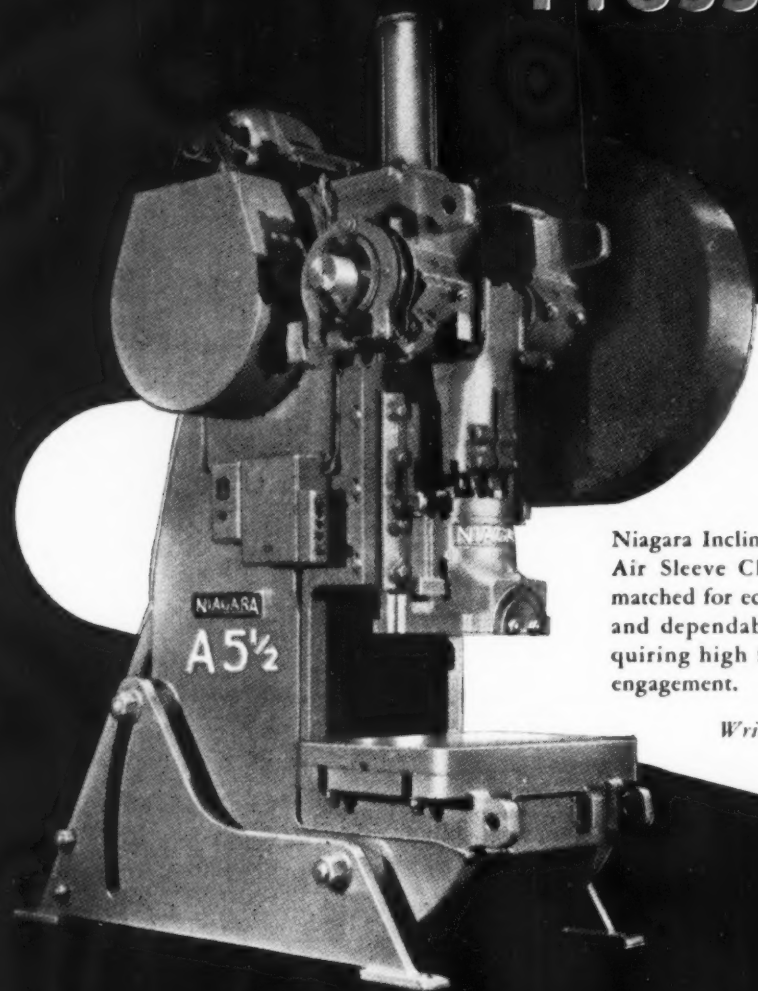
POSITION _____

COMPANY _____

CO. ADDRESS _____

CITY _____ ZONE _____ STATE _____

NIAGARA Inclinable Presses



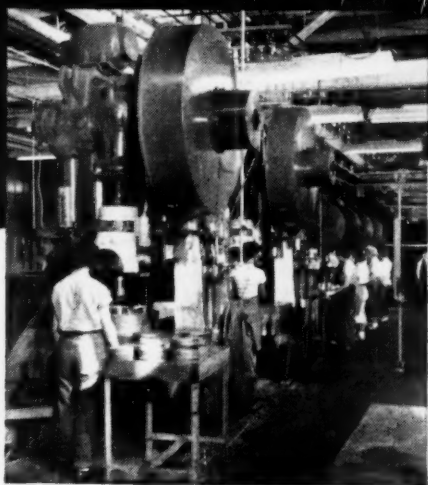
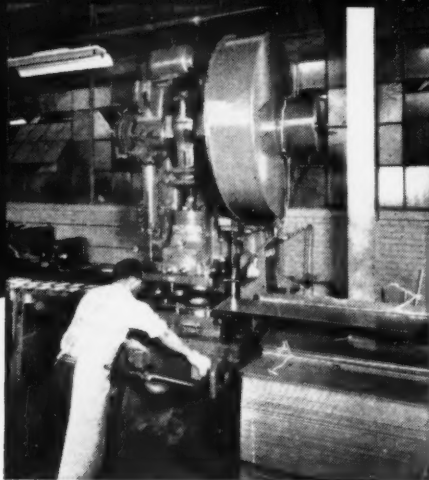
Niagara Inclinable Presses with Air Sleeve Clutch cannot be matched for economy, efficiency and dependability on jobs requiring high frequency clutch engagement.

Write for information.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

On the Production Line

AT SHWAYDER BROTHERS/ INC., DETROIT



1. Punching two round blanks per stroke on Niagara A-5½ Press with Air Sleeve Clutch.



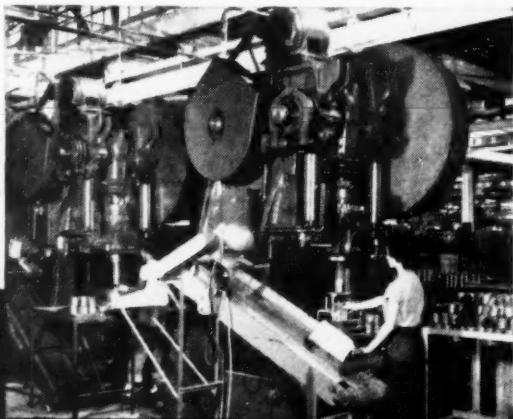
2, 3. Cupping and Re-drawing on A-5½ Presses with Air Sleeve Clutches.



4, 5, 6, 7. Indenting end on A-3½ Presses.



8, 9. Forming hexagonal shape and Ironing side wall on A-5½ Presses with Air Sleeve Clutches and with Niagara Cushions.



The final piercing and tapering operations are done on A-3½ Presses (not shown.)

NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA

Dealers in principal U. S. cities and major foreign countries

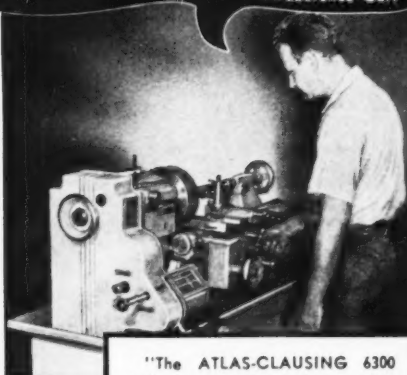
"most lathe per dollar invested"

— Laurence Carl

exclusive design features put

CLAUSING 6300 12" HEAVY DUTY PRECISION LATHES in a class by themselves

On any basis of comparison, ATLAS-CLAUSING 6300 Series are standout values for efficient 24-hour production... tool room or research work. 8 speeds, 50 to 1300 RPM — 12 $\frac{3}{4}$ " swing over bed, 7 $\frac{1}{2}$ " over saddle, 24" — 36" — 48" between centers — headstock, apron, and quick change gears run in baths of oil. Get all the facts from your ATLAS-CLAUSING Distributor.

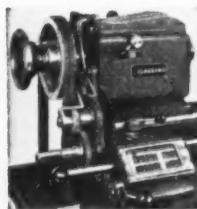


"The ATLAS-CLAUSING 6300 lathe is the most lathe per dollar invested available within its size range. Because of its in-built accuracy we are able to move spindle and nose fixtures from one lathe to another without affecting the accuracy of the product. The upkeep is unusually low and operators can deliver large production because of good control. It's a fine profit making machine."

Signed — Laurence Carl
Carl Manufacturing Company

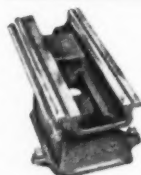


The heavy, thick-walled grey-iron headstock is fully enclosed and all moving parts run in a pumped bath of oil. Spindle is forged, precision-ground steel with 1 $\frac{3}{8}$ " bore and 1" collet capacity... turns on heavy duty Timken precision tapered roller bearings. Hardened and ground spindle nose L-00 is tapered key-locked type. Spindle can be reversed without danger of the chucks coming off.



Drive is underneath, with spindle pulley mounted "outboard" — replacing belts is a quick, easy job. Dual A-belt drive assures full transmission of power.

Quick-change mechanism is enclosed... gears and shafts run in bath of oil. Provides instant selection of 48 threads or feeds. Feeds from .00065" to .036" per revolution of spindle, and right and left hand threads from 4 to 224.



Massive, semi-steel bed is 7 $\frac{3}{4}$ " wide, 5 $\frac{1}{4}$ " deep — thickly ribbed and braced. Vee-ways, flat ways and undersides are ground — all eight surfaces align to within .001".



Heavy, quick positioning tailstock. Permanently attached swing type wrench controls bed lock. Graduated ram is bored for No. 2 Morse taper.

SEND FOR CATALOG TODAY!

CLAUSING DIVISION
Atlas Press Company

11107 N. PITCHER STREET, KALAMAZOO, MICHIGAN

LATHES • DRILL PRESSES • SHAPERS • MILLING MACHINES

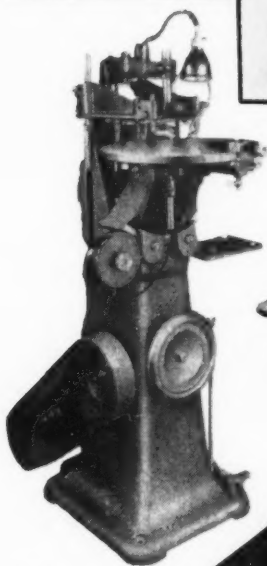


PROVED!

OLIVER DIE MAKING MACHINES

Slash Toolroom Costs . . .

**Assure Accuracy, Speed^{*}
and Ease of Operation**



More than 10,000 Oliver Die Making Machines are in use throughout the world. Users report their efficiency, speed and accuracy cut time and labor costs up to 60 per cent (Oliver Die Makers are so simple to operate that skilled labor is not required). For 40 years Oliver Die Makers have been famed for machine sawing, filing and lapping with precision perfection.

Oliver Die Makers are dependable and long-lasting (many in continuous use for more than 25 years). They save time and money . . . assure accuracy the proved way — **THE OLIVER WAY.**

Oliver Die Makers available in 5 models —

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

**Write Today For Complete Technical Data on
OLIVER DIE MAKERS**

See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1408 E. MAUMEE • ADRIAN, MICHIGAN

**MACHINE TOOLS
by OLIVER include:**

**AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES**



HIGH SPEED STEEL

THREAD MEASURING WIRES

**. basic tools in a
universally accepted
method of check-
ing screw
threads**

VK Set No. 20 HS Thread Measuring Wires, accurate to $\pm .000025''$ for 20 common pitch Unified and American screw threads, 6 to 36 threads per inch.

The Van Keuren Catalog and Handbook No. 35 contains 91 pages of technical and engineering information on wire measurement of screw threads. This information, compiled from many years' research in the field, is available without charge by addressing: The Van Keuren Co., 177 Waltham St., Watertown, Mass.

The three-wire method is probably the best known and most widely accepted system of measuring pitch diameter of screw threads. Equipment required includes only a set of VK Thread Measuring Wires of proper diameter and an accurate measuring instrument.

Van Keuren Thread Measuring Wires have been developed over a period of many years of pioneering in the precise measurement field. They are made to National Bureau of Standards specifications, are held within .00002'' for roundness, straightness and identity and to within .000025'' of exact size.

VK Thread Measuring Wires are made of long-wearing, tough, and beautifully finished high speed steel and are either $1\frac{1}{8}''$ or $2''$ in length. Every wire is subjected to the closest criteria in today's standards of accuracy.

In addition to set No. 20, shown here, VK furnishes many other standard sets as well as special wires in diameters from .001'' to 1.500''.



THE *Van Keuren* co.,

177 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Cemented Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires





UNPARALLELED GRIP from parallel jaws

Latest And Greatest In Collet Design! Tool engineers and machine tool builders praise the Jacobs Rubber-Flex Collet as one of the outstanding developments in modern tool history. This new principle of collet construction brings you not only great improvements in gripping power, accuracy, and service life, but — *for the first time* — a collet with a full $\frac{1}{8}$ inch capacity range.

The Jacobs Manufacturing Company, West Hartford 10, Conn.



IF IT'S A **JACOBS** IT HOLDS

**Jacobs and your
local distributor**

are ready to deliver the chucks you
need and the service you deserve.

... first in chucks

... first in service



**what products
do you make
that need
*permanent***

- ✓ MARKING
- ✓ NUMBERING
- ✓ GRADUATING
- ✓ EMBOSSING
- ✓ DEBOSSING

**NOBLEWEST RAPID PRODUCTION EQUIPMENT WILL
MARK THEM FASTER - BETTER - AT LOWER COST**

Constantly higher marking speeds and lower costs per unit marked . . . have established Noblewest as the world's leading manufacturer of rapid precision equipment for the permanent marking of metal, plastic, hard rubber, wood. Model 157 (illustrated), with new improvements, can be tooled for marking many sizes and shapes of pieces.

Noblewest is equally famed for fine marking dies. Made to the most exacting standards of quality, only the very finest steel, carefully heat-treated, is used.

For complete details on Noblewest marking machines, tools and dies, write Noble & Westbrook Mfg. Co., 9 Westbrook Street, East Hartford 8, Conn.



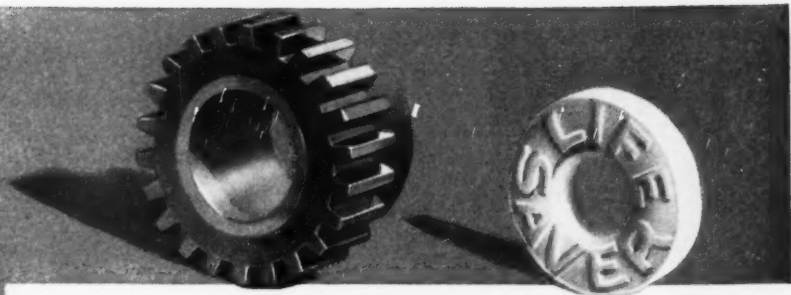
MARK IT BEST WITH

NOBLEWEST

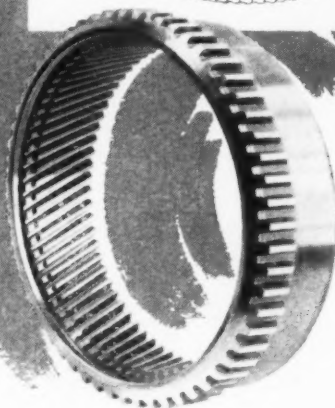
NOBLEWEST
IMPROVED
MARKING
DEVICES

Roll-Matic

MARKING



A **GREAVES GEAR** CAN BE A **LIFE SAVER!**



Ability to get good gears quickly in case of a breakdown—or for any other reason—can be a real 'life-saver'. Greaves offers that kind of service . . . the kind you can depend on when machinery is down and every minute counts. And Greaves is a good source for your day-to-day gear requirements, too. Why not write or wire us today for a prompt estimate. No obligation naturally.

Greaves makes spur, helical, bevel and worm gears, pinions, worms and leadscrews . . . in sizes from the small 'life-saver' variety up to—how big do you need 'em?

GREAVES MACHINE TOOL
COMPANY

2600 Eastern Avenue, Cincinnati 2, Ohio

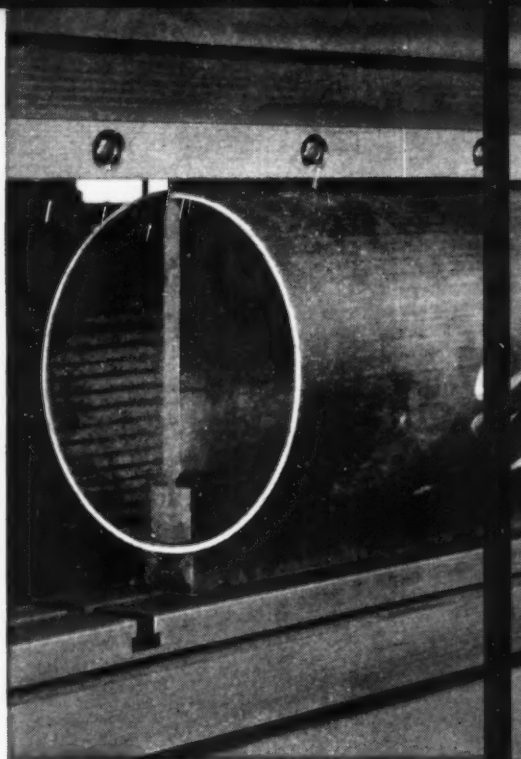
Established 1917 • Division J. A. Fay & Egan Co.



Makers of
Greaves Milling Machines

**pipes
...tubes
...posts**

**...ACCURATELY and
EASILY formed on**

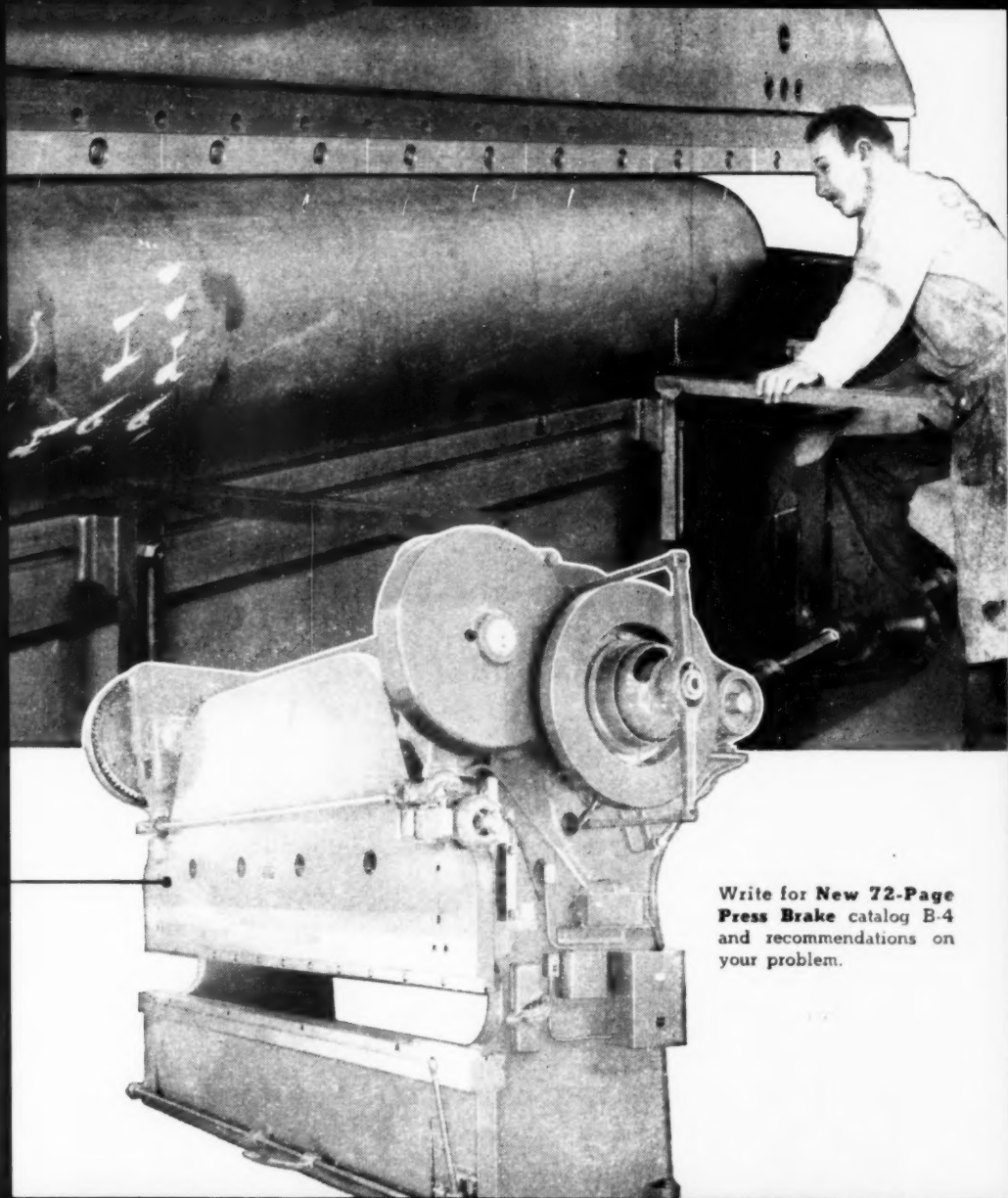


Cincinnati Press Brakes

Large diameter pipes and tubes can be completely formed on versatile Cincinnati Press Brakes. Round, tapered lamp posts up to 30 feet long are also formed by prebending the edges and then completing the tapered tube in several additional hits on taper dies.

Cincinnati Press Brakes also crimp sheet and plate before rolling to eliminate flats at the seam edges.





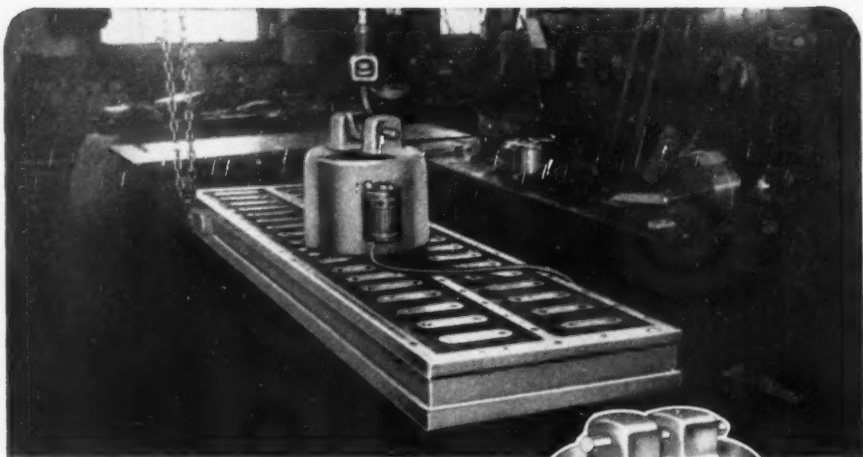
Write for New 72-Page
Press Brake catalog B-4
and recommendations on
your problem.

THE CINCINNATI SHAPER CO.

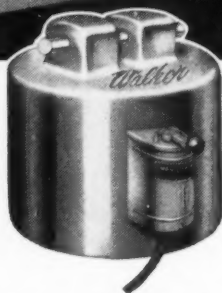
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES





**Pound for pound, volume
for volume, this is the
strongest magnet made**



WALKER MAGNETS—The utilization of magnetic force under the most efficient conditions is the outcome of Walker's more than fifty years of research and development. . . . The 12" diameter Walker lifting magnet shown holds work up to 5000 pounds.

The Walker material is high in permeability and magnetized to complete saturation with equal flux distribution. . . . The Walker line includes contoured lifting magnets increasing the area of contact for special applications (for wire, pipe, etc.)

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

IN CANADA — UPTON BRADEEN & JAMES, LTD.

GRITCLOTH

OPEN MESH SANDING FABRIC

PATENT
APPLIED
FOR

**REVOLUTIONARY DISCOVERY...
"HEARD 'ROUND THE WORLD"!**

The world-wide demand for our latest abrasive development, GRITCLOTH, has already forced us to increase our production capacity. Right now, we are keeping abreast of the still growing clamor for this most advanced sanding material.

GRITCLOTH gives the removed particles a place to go, and thereby maintains fast cutting action throughout its amazingly long life.

For machine and hand sanding or polishing - wet or dry - it's GRITCLOTH. Order now!



Marine Finishes . . . Fast, smooth, prime-coat rubbing — WET, or DRY. Extra-long life with GRITCLOTH.



Metal Fabrication . . . LESS DOWN-TIME means more production with GRITCLOTH. Excellent for metal finishing and deburring.



Automotive Finishes . . . USE BOTH SIDES OF GRITCLOTH for maximum life. Outstanding in automotive field.



Metal Polishing . . . NON-LOADING for fast, economical stock removal by machine or hand. Save with GRITCLOTH.

★ 10 to 15 TIMES LONGER LIFE than the conventional types of coated abrasives.

★ NON-LOADING... OPEN MESH LETS THE REMOVED PARTICLES FLOW RIGHT THROUGH.

★ THOUSANDS OF SUPER-SHARP EDGES KEEP ON CUTTING.

★ APPLICATIONS ARE LIMITLESS . . . each day finds a new successful operation for this Miracle Modern Sanding Fabric.

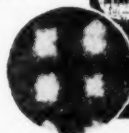
★ USE WET OR DRY

★ FLAT OR FOLDED

★ BY MACHINE OR HAND

★ BOTH SIDES

Where
can you
use it?



**GRITCLOTH...
a BAY STATE
Pioneered
Product**

**BAY
STATE**

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass., U. S. A.

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal cities

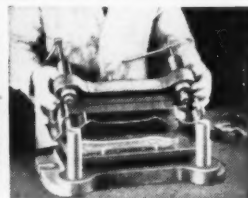
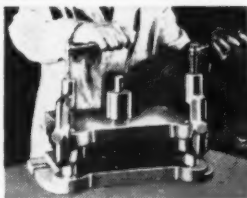
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Separate Die Sets This *Fast*, Simple Way...



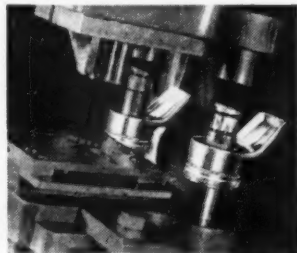
The principle of the Acro Die Set Puller is to remove the punch holder from the die shoe by a straight upward pull, where-by punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This is accomplished only by use of the indexed screw wrenches

which act as indicators, controlling the upward travel. This is an exclusive patented Acro feature, found only in Acro Die Set Pullers.



AND, Protect Leader Pins With These Efficient Oilers

Acro Pin Oilers fit over each leader pin and seal in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly over leader pins. Eliminate bushing wear, leader pin scoring, and maintain die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.



Free Data

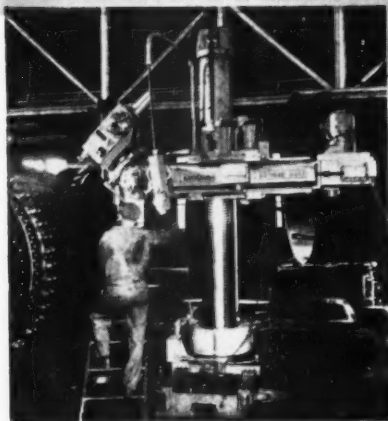
Covering each of these and other profitable Acro accessories is included in our folder. Write for bulletin BB.

ACRO
Metal Stamping Co.
332 EAST RESERVOIR AVENUE
MILWAUKEE 12, WISCONSIN

MACHINE and TOOL BLUE BOOK

Kaukauna **DRILLING and TAPPING Machines**

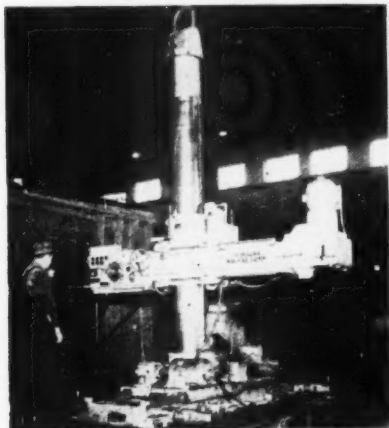
UNIVERSAL AND HORIZONTAL



Model 125-U drilling and tapping angular holes in high pressure vessels using a 2 3/4" drill and a 2 1/2" pipe tap.

PROFIT FROM ANGULAR, VERTICAL AND HORIZONTAL OPERATIONS *WITH 1 SETUP*

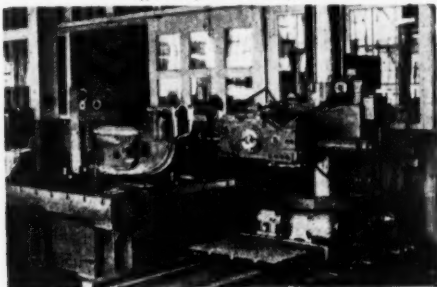
Almost any casting or weldment—of almost any size and shape—can be drilled, tapped or spot-faced in any location accurately, quickly and easily with a **KAUKAUNA** Machine. Furnished with Universal Head with compound swivels, Tilting Head or Horizontal Head, all with 360° column swivel. Horizontal traverse on runway and vertical traverse on column to suit requirements. For portable or fixed location use.



Model 125-HR drilling, reaming and back spot facing holes in a 40 cu. yd. bucket.



Universal Machine drilling, tapping and doweling racks in place on floor type boring machine runways.



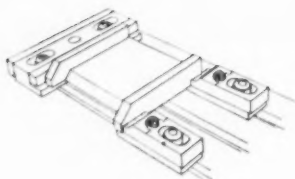
Model 1030 on production setup, drilling, boring and tapping horizontal holes in milling machine bases, columns, headstocks and tables.

Cut your costs on setup time, crane time, fixturing and machine hours. Write for Catalog.



Kaukauna MACHINE CORPORATION
KAUKAUNA, WISCONSIN, U. S. A.

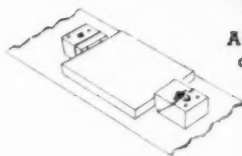
J & S DOUBLE 1/2 VISE WITH MATCHING PARALLELS



- for unquestionable repeated accuracy
- for quicker set-ups
- for stronger grip
- for less obstruction

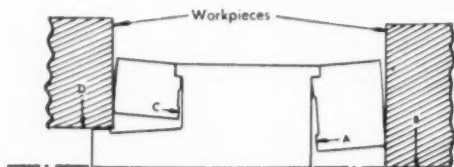
DOUBLE 1/2 VISE IN USE WITH ALL-PURPOSE JAW CLAMPS

for use on jig borers, millers,
planers and shapers.



J & S DOWN-HOLDING COUNTER CLAMPS

Acts on same principle
as double 1/2 vise (left).
Fixture clamps operate on the same
principle as the all
purpose jaw
clamps.



Approximately 3 tons pressure closes Gap A, and approximately 1/2-ton closes Gap C—producing a down-holding action on each respective piece of approximately the same force.

Hinged, Spring-Loaded Jaw Gives Positive Down-Holding Action

Hinged lip in-and-down action combined with in-and-down action of clamp holds workpiece against table and absolutely parallel. Construction is of oil-hardened tool steel, ground and blackened.

Jig Borers—quickly set up for jig boring accuracy.

Millers—eliminates heavy miller vise and allows milling of more pieces.

Planers—eliminates strap and finger setups.

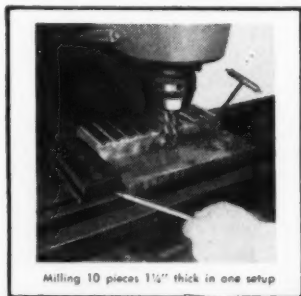
Shapers—eliminates vises.

J & S TOOL CO., INC.

647 W. Mt. Pleasant Ave.

Livingston, N. J.

(N. J. Highway Route No. 10)



Milling 10 pieces 1 1/2" thick in one setup

**J & S
TOOL CO. INC.**

DELIVERY FROM STOCK

WRITE FOR NEW FOLDER

—contains complete details on advantages,
applications, types and sizes available

Booklet describing J & S "Hydramatic"
Wheel Drives, etc., also sent on request



SOUTH BEND 2-H TURRET LATHE

Keeps Costs Down on Precision Parts

This precision-built turret lathe is designed specifically for the machining of accurate, duplicate parts. It is especially suited for large-volume, second operations that require close tolerances and smooth finishes.

The choice of 48 power cross feeds, power longitudinal feeds and thread cutting feeds and the 96 power turret feeds provide combinations for maximum cutting efficiency. Find out now how this precision turret lathe can help keep down your costs.



**MODEL 2-H.
TURRET LATHE**
Available with 6' or 7' bed, 28 1/4" or 40 1/2" maximum spindle nose to turret face distance; 1" capacity; 1 3/4" collet through spindle. Turret has adjustable power feed stops, each tool, at stop setting. Double tool slide carriage.



Can I get it?
When? How?

Yes - you can get most any South Bend product immediately from our distributor's stocks in principal cities. Items not stocked, shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

SEND INFORMATION CHECKED:

- | | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| <input type="checkbox"/> 9" and 10" BENCH LATHES | <input type="checkbox"/> 10" to 16-24" FLOOR LATHES | <input type="checkbox"/> DRILL PRESSES | <input type="checkbox"/> TOOL GRINDERS | <input type="checkbox"/> 1/2" & 1" Collet TURRET LATHES | <input type="checkbox"/> 7" BENCH SHAPERS |

Name _____ Company _____

Street _____ City & State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana



GAIN THE

Full Benefits of

MAGNETIC CHUCKING



Manual or Motor
Control Models
for 50 to 5000
Watts. Chuck
area 60 to 7500
Sq. In. Special
Models to Suit.



**ELECTRO-MATIC
RECTIFIERS**

Engineered for dependable power conversion for industrial purposes. Most models equipped with automatic electronic Time Delay Switch, adding years to tube life. Quiet and efficient. Fully guaranteed.

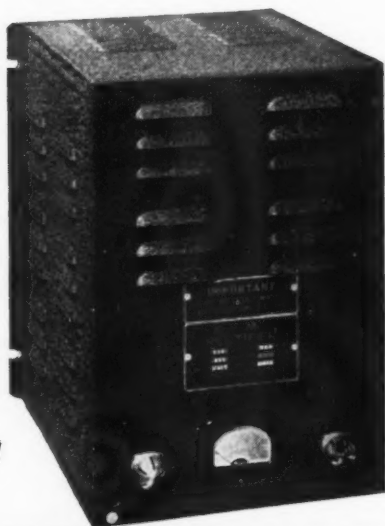
Full Particulars Without Obligation

ELECTRO-MATIC PRODUCTS COMPANY
2235 North Knox Avenue
CHICAGO 39, ILLINOIS

NEUTROL

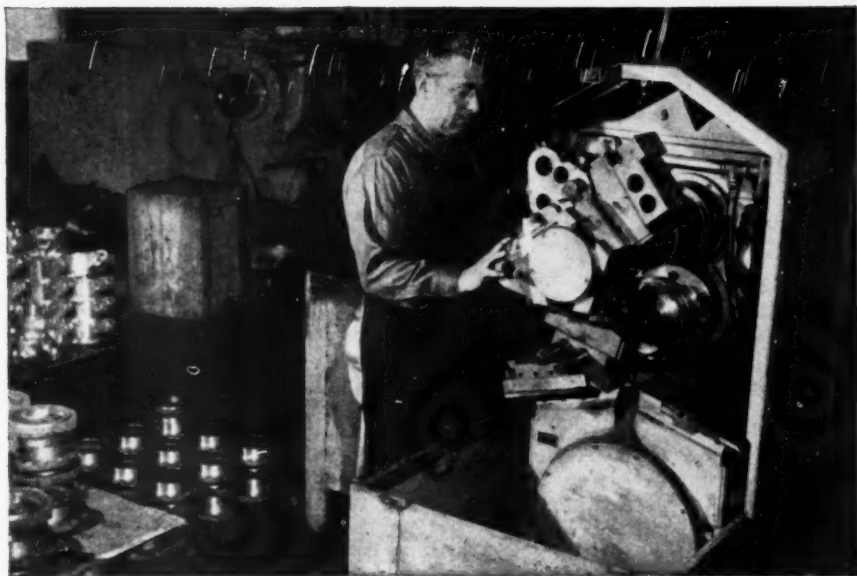
**ELECTRO - MAGNETIC
CHUCK CONTROLS**

Release and demagnetize work pieces simultaneously. No time lost. No damage to work or to chuck faces. Protect chucks from voltage surges. Speed production.



32
MODELS

•
50 to
20,000
Watts



When Precision was the Pay-Off!

HALEY MACHINE CO., Springfield, Ohio, recently installed a Warner & Swasey 1 AC Single Spindle Automatic Chucking Machine to turn vital, high-precision hydraulic pump parts for U.S. Army tanks. The job called for extreme accuracy, because these pumps are filled under pressure with an anti-freeze that has a tendency to leak where water will not.

To avoid leakage these extremely close tolerances had to be held—40 to 63 micro-inch finish on surface finishes, .002" on forming, .0008" to .001" on turning, and .001" in concentricity. Maintaining such accuracy with previous methods was difficult—scrap loss was too high.

**WARNER
&
SWASEY**
Cleveland
PRECISION
MACHINERY
SINCE 1880

Production had to be speeded up.

The Warner & Swasey Automatic took the function of holding these close tolerances out of the operator's hands—substituting the automatic operation of this high-precision machine for the job. Production was doubled—in some cases tripled! Scrap loss was reduced 12 to 15%!

This type of consistent accuracy is just not possible by manual methods due to the human error of even the best machinists. It is even unusual for an automatic. But the Warner & Swasey 1 AC has the rigidity, the *built-in* accuracy, plus the ability to repeat accurate settings to handle the *most difficult* jobs!

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

**WHY
YOU
GET**

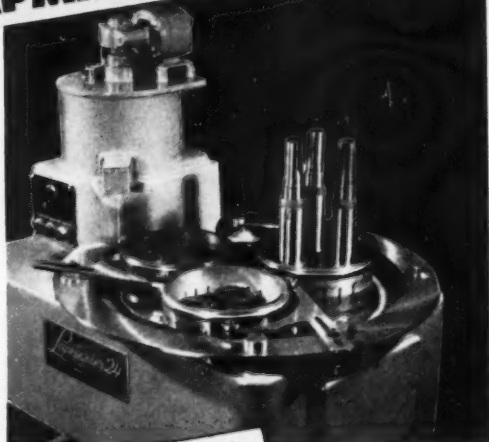
*Precision Flatness,
Finish and Parallelity
in Production Quantities...*

WITH A LAPMASTER

Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.

Check these features and investigate the possibilities for the Lapmaster in your plant.

1. Operator requires no previous lapping experience.
2. Automatic timer provides controlled lapping cycle for production efficiency and allows time for pre-loading work-holders.
3. Simplicity of design allows ease of loading and unloading.
4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent-compound and removed stock.
6. Precision laps identical parts or parts of various shapes, heights and materials in one cycle.
7. Self-conditioning lap plate eliminates down time for truing or replacement.




How the Lapmaster Works


The work being lapped causes wear on heavy cast iron lap plate.



As the work is wearing the lap, the conditioning rings are continuously conditioning the lapping plate surface.



Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.



FREE DATA



Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today.

JOHN CRANE

Crane Packing Company, Dept. 88-11, 1812 Cuyler Ave., Chicago 14, Ill.

CRANE PACKING COMPANY

SAVE TIME

with HARTFORD SPECIAL

SUPER-SPACERS



HARTFORD
Special

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

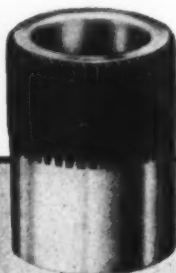
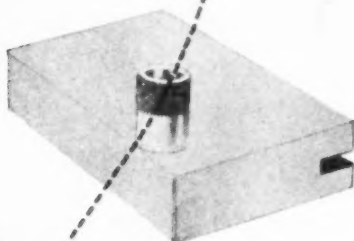
American HAS THE ANSWER.

SERRAGRIP

Can't Slip

(Pat. Pending)

FOR PRESSING INTO
SOFT MATERIALS



For use in fibreglas, wood, plastic, mason-ite and soft metal tooling! American Serragrip drill jig bushings can be pressed into softer materials without shearing. The serrations on the drill bushings are made to ease their way in without tearing the material. Once in, the American Serragrip drill bushing's exclusive design will not permit slipping or rotating. You'll save time and money if you specify American Serragrip drill bushings.

DELTA GRIP

Won't Spin Out

(Pat. Pending)

FOR IMBEDMENT IN
CASTABLE MATERIALS



HEADLESS
PRESS FIT



SLIP
RENEWABLE



LINERS



HEAD
PRESS FIT



FIXED
RENEWABLE

SEND FOR
FREE CATALOGS
AND COMPLETE TECHNICAL
DATA AND INFORMATION

LOOK TO *American* FOR A COMPLETE LINE OF DRILL JIG BUSHINGS

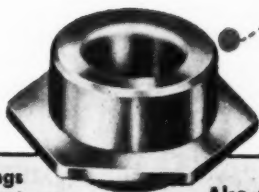
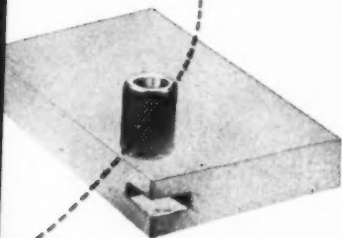
FOR EVERY DRILL BUSHING PROBLEM!

Three new drill jig bushings that will save you money! Call or write us for information on the application of these new drill bushings to your problem.

HEX-A-GRIP

Positive Grip (Pat. Pending)

FOR IMBEDMENT IN CASTABLE MATERIALS



American's Deltagrip drill jig bushings can't slip or rotate in the material cast around them. They are made especially for use in castable materials such as Cerromatrix, Plastic, etc. Because of their design with the **FOUR-WAY DIAMOND GRIP**, Deltagrip drill bushings withstand the torque and thrust of the tool — they won't spin out. Save time, save money — stop costly shut downs; get Deltagrip drill bushings now!

Also made for use in castable materials, the Hexagrip design keeps them from raising, lowering or spinning. They stay put! Save on costly drill jigs — use Hexagrip, Deltagrip or Serragrip drill jig bushings.

**EXCLUSIVE DISTRIBUTORS LOCATED IN EVERY
MAJOR AREA THROUGHOUT THE UNITED STATES**

American DRILL BUSHING CO.

5107 PACIFIC BLVD.

LOS ANGELES 58, CALIF.

FEATURING THE ORIGINAL



IMPROVED METHOD OF DESIGNING

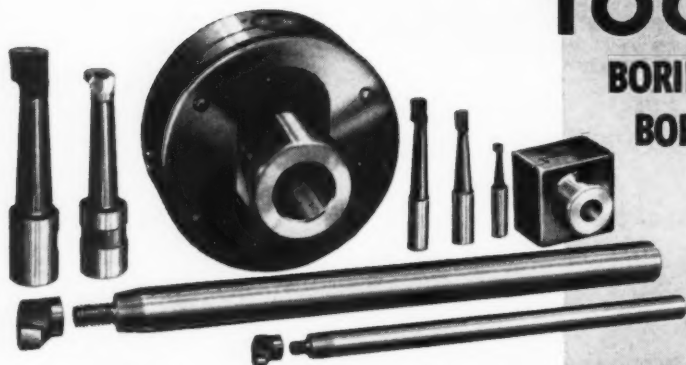
TELEPHONE - LOGAN 5-7147

for more *Accurate* cuts...

greater *Rigidity* in

BORING TOOLS

BORING HEADS
BORING BARS



Use

CRITERION

BORING EQUIPMENT

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS.

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ⅜ to 1¼ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

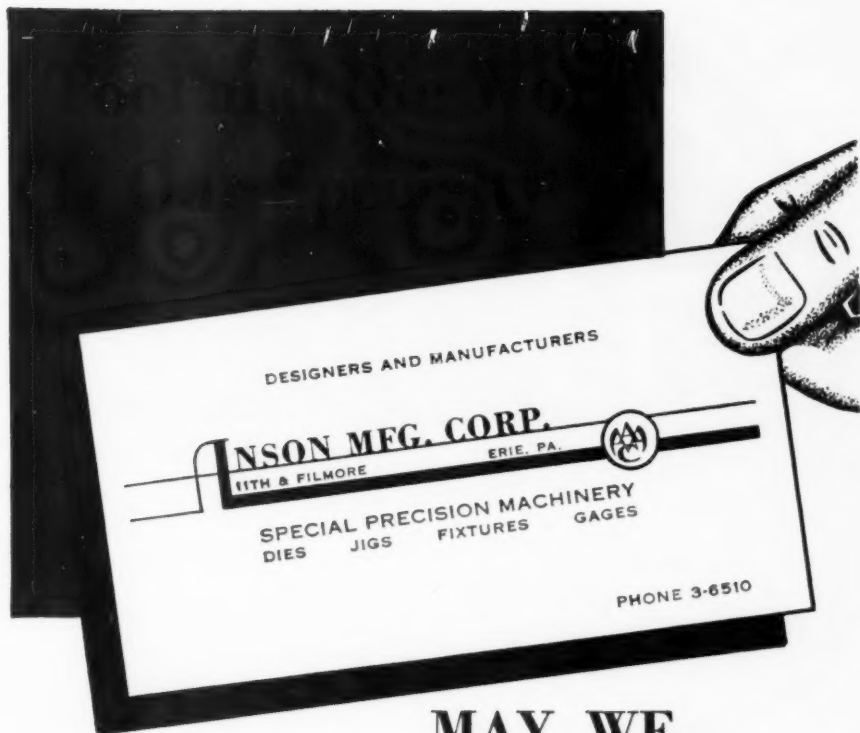
LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

See the complete line of CRITERION TOOL PRODUCTS at your local dealers or write for free catalog.

**CRITERION
MACHINE WORKS**

9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

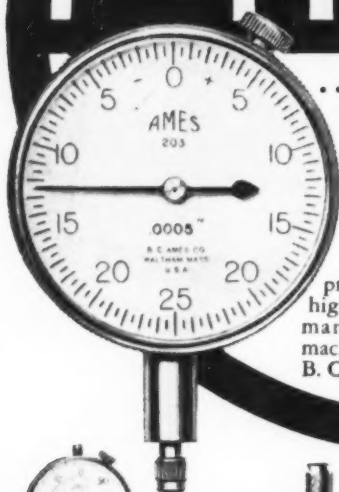


MAY WE SERVE YOU?

**TOOLS • DIES • SPECIAL MACHINERY
FIXTURES • PRECISION CONTRACT
MANUFACTURING •**

**WRITE FOR
ILLUSTRATED
BOOKLET**

AMES



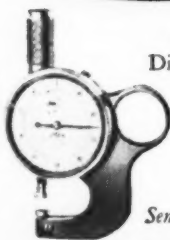
... the preferred Dial Indicators

One of America's largest and most famous mass-producers recently chose Ames as preferred source of supply for indicator gauges. They did because the four sizes of Ames "Hundred Series" indicators fit every measuring requirement; they are *accurate, sensitive, low in friction, yet are rugged and tough* — give *more on-the-job time*. All Ames products embody latest design and highest-quality materials; they are manufactured by methods and machines that are *exclusive* with B. C. Ames Co.



Ames
Dial Depth Gauge
No. 11C

Ames
Dial
Micrometer
No. 517



Ames
Amplifying
Dial Comparator
No. 26



Ames
Small
Hole
Gauge
No. 36

Send today for your free copy
of Catalog No. 58

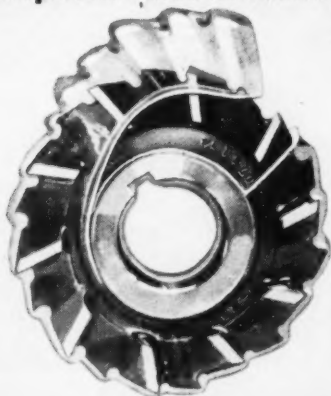


Representatives in
principal cities.

B. C. AMES CO. 28 Ames Street
Waltham 54, Mass.

Mfrs. of Micrometer Dial Gauges • Micrometer Dial Indicators

during shipment and in stock



Prevents Rust and Corrosion
Protects Cutting Edges from Chipping and Abrasion
Cushions Impact from Rough Handling

WESTCOAT-AMBER

protects valuable tools *Completely*

SAVE . . . TIME . . . WORK . . . MONEY

- Quick easy dipping — saves labor. • Sets in 60 seconds — saves time.
- Strips easily—slit, peel coating and part is ready for use.
- Saves shipping weight and storage space. • Can be remelted and reused.

Cut packaging costs with simple, inexpensive hot-dip WESTCOAT-AMBER. Cuts labor to a minimum, yet gives complete metal parts protection against rust and abrasion. Saves weight and space.

AMBER is the companion coating to famous WESTCOAT-CLEAR No. 202, the coating that far exceeds military Specification JAN-C-149, Type II. Method 1B Packaging.

PROTECT WITH
WESTCOAT

WESTERN COATING COMPANY

Eastern Plant, P. O. Box 227, Elyria, Ohio
Western Plant, 85 West Union Street,
Pasadena 1, California

Representatives in principal cities

Fill in coupon and mail

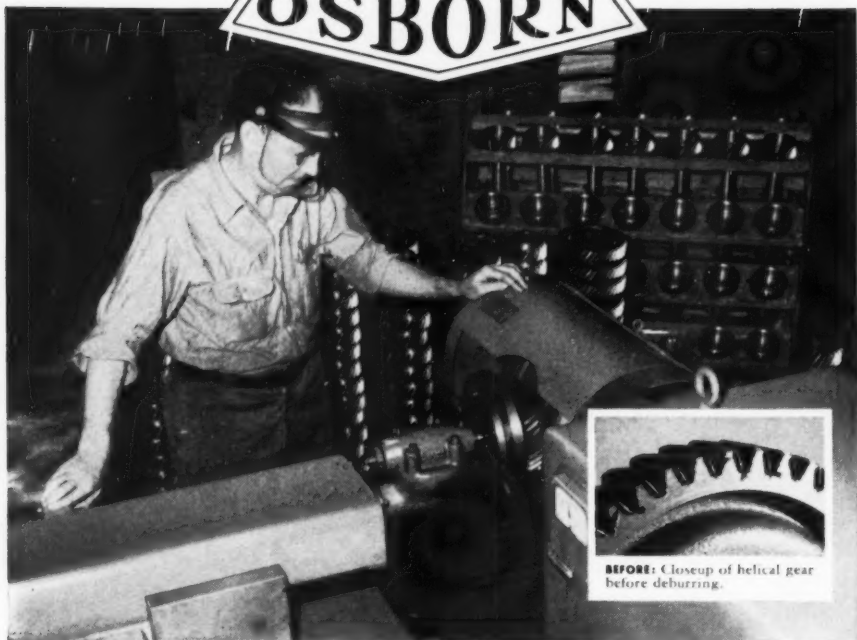
Send me descriptive literature ☐ and prices ☐
on Western Coating products.

NAME & COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

OSBORN



BEFORE: Closeup of helical gear before deburring.

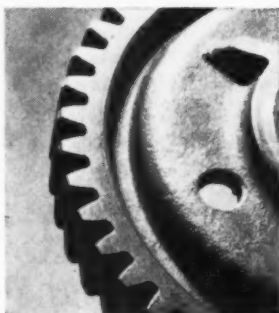
Gone . . . costly thorns in their side

Burr removal by muscle methods is aggravating because it is costly, inefficient and non-uniform in quality. Here's how a truck manufacturer has banished these "thorns in the side" with push-button brushing.

The operation: to deburr, break and blend the flank edges of gear teeth prior to shaving and heat treating. Formerly done with a hand tool, in several operations, the work was tedious and required close inspection and reworking to meet rigid specifications.

Now, an Osborn Brushing Machine in one speedy operation smooths the entire tooth edge . . . produces *uniform blending* of surface junctures of *every tooth*. Result: lower costs and greater precision for *better performance* of the product in service.

Find out how you can cut your costs and improve *your* products with power brushing. Call the nearby **Osborn Brushing Analyst** or write *The Osborn Manufacturing Company, Dept. L-6, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



AFTER deburring with Osborn Brushing Machine.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

Smith & Mills SHAPERS

Rugged power for "roughing." Sensitivity for accuracy and fine surface finishing.

Exclusive solid ram for stamina, low maintenance and easier adjustment. Standard and heavy duty models for modern tool room and production service.



SIZES

16"
20"
24"
25"
28"
32"
36"

PLAIN TABLES • TILTING TABLES
UNIVERSAL TABLES

The **Smith & Mills COMPANY**

Affiliated with Bryant Machinery & Engineering Company
General Office: 640 W. Washington Blvd., Chicago 6
EXCLUSIVE REPRESENTATIVES THROUGHOUT THE WORLD

Fine Shapers
since 1888

**Saved 71½ hours
PER 1,000 PIECES!**

**ELIMINATES
5 OPERATIONS**



says
GEORGE ENHORNING
Chief Tool Engineer
KALART CO., Plainville, Conn.



PIVOT HIGH SPEED STEEL PUNCHES
STRAIGHTGROUND • WHIPSLEEVED



REPLACE DRILLING AND REAMING

Drilling 18 holes, varying in size from .042 to .125 in .093-inch leaded brass required 140.5 hours per 1,000 pieces in 21 operations at Kalart Company, producers of photographic equipment.

Mr. Enhorning says:

"Despite the fact that the thickness of the metal exceeds the diameter of thirteen of the holes by more than 2 to 1, the use of Pivot Punches (Series X S) enabled us to eliminate drilling and reaming, using piercing only. We were also able to reduce the number of operations to 16—and can now produce 1,000 pieces in only 69.0 hours."

* Put Pivot Punch power, accuracy and longer punch life to work for you for higher production at lower costs.

Ask for FREE Catalog showing Standard Prices.
Write Dept. M.T.



pivot punch and die corp.

NORTH TONAWANDA, N. Y.

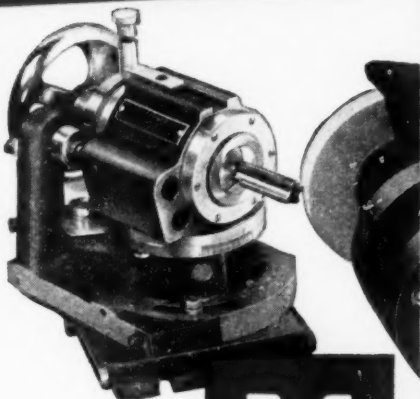
RELIEVES FORM TOOLS • RELIEVES CENTER DRILLS

RELIEVES TAPS • RELIEVES COUNTERBORES • RELIEVES SPHERICAL CUTTERS

What a relief!
...RADIAL relief!

**FOR MORE CUTS PER
GRIND and BETTER
CUTS — SHARPEN
STRAIGHT and SPIRAL
TOOLS WITH D • S**

By actual user experience, radially relieved tools have outlasted tools with standard angular relief by as much as 5 times. They cut freer and better. D.S. is readily set up and radial relief can be produced by any good grinder hand without special experience. Hundreds of these fixtures are now in use.



**D • S
RADIAL
RELIEF
GRINDER**

Grinds and relieves
accurately any
type of tool
with cutting edge
relief.



Any amount of
margin, parallel
with cutting edge,
can be left if de-
sired on either
straight or spiral
tools.

**NEW
HOME
OF
D • S**

WRITE FOR OUR CATALOG

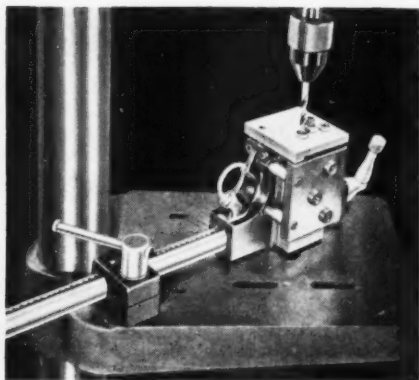
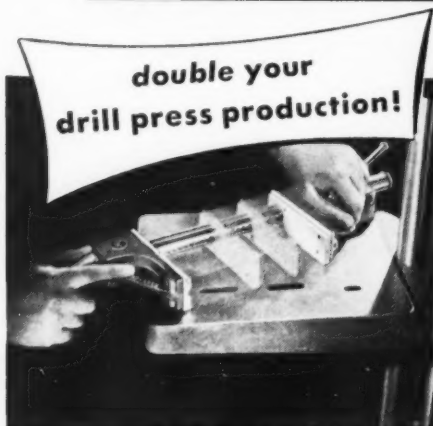


**D • S GRINDER DIVISION
Royal Oak Tool & Machine Co.
Stephenson Hyway • Royal Oak, Mich.**

RELIEVES PROFILE MILLS • RELIEVES REAMERS • RELIEVES STEP DRILLS

RELIEVES BORING BARS • RELIEVES HOLLOW MILLS

NEW AMF Float-Lock Instant-Change Safety Vise



IDEAL BASE FOR DRILL JIGS

Retaining its full-floating and locking features, but otherwise completely redesigned, the new AMF Float-Lock *Instant-Change* Safety Vise is faster, huskier, greater in capacity (9" and 12" jaw openings)... the most versatile, most economical work holder yet devised for drill presses!

New ratchet-locking jaw slides *instantly* to desired opening. The other, screw-operated jaw positively locks—or completely releases—work with a mere flick (about ¼-turn) of the handle.

Vise turns over readily on three sides, permits extensive drilling without removing work. Horizontal and vertical "V" grooves align and grip rounds for end drilling, centering... ideal for angle drilling. Vise serves as low-cost drill jig when locked anywhere on the table... swings out of the way when not needed. Saves so much set-up time, compared with usual work-holding devices, that good operators should easily be able to double their production!



Contact your local AMF Float-Lock distributor for a demonstration. Or write for his name and address and a copy of new, descriptive Folder WF 53-1(a). Wahlstrom Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Ave., New York 17, N. Y.

MODELS ALSO AVAILABLE FOR BAND SAWS



Prominent in the Jet Engine Program



1.0003

1.0000

"PACKAGED PRECISION"

NEEDS NO WIRES,
HOSE, ELECTRONIC
GEAR OR
HEAVY BASE



COMTORPLUG

FOR GAGING HIGH-PRECISION HOLES

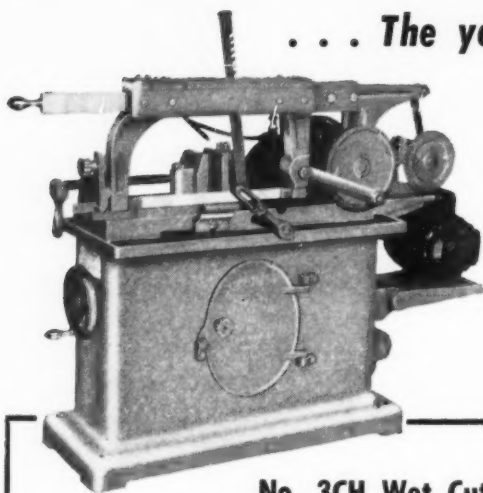
REQUEST NEW BULLETIN NO. 46

COMTOR CO. 62 FARWELL ST., WALTHAM 54, MASS.

Barwood & Company 2127 North 100th St. Philadelphia 22, Pa.	Garold B. Duff & Co. 68 Clinton Ave. Newark 6, N. J.	Francis D. Huntington 5101 East Jefferson Ave. Detroit 14, Michigan	Procter & Martin Co., Inc. 207 Franklin Street Boston, Mass.	Harold E. Sundberg Chicago Square Buffalo 2, New York	Conant Tool & Engineering Co. 122 West 142th Street Chicago 28, Illinois
Edwin Beutler 4025 Delaware Blvd. St. Louis 8, Missouri	Leone A. Galt 144 Spruce St. Berkeley, California	M. I. Levin Fairview Park 4106 West 714th St. Cleveland 26, Ohio	Walter R. Galt 100 Abingdon Rd. Baton Rouge 9, Louisiana	C. D. Supply Co. 214 East 10th St. Tulsa, Oklahoma	Securex Tools of Canada 80 Front Street West Toronto, Ontario, Canada
					Robert M. Cooke 4780 East Olympic Blvd. Los Angeles 12, California

Engineering Sales Company, 117 Portland St., Houston 700 — 1951 South Harvard, Dallas 750.





**No. 3CH Wet Cut
6 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ " capacity
KELLER *Power* HACK SAW**

For the maximum output with the minimum investment, the Keller No. 3CH is the year's most outstanding power hack saw buy! Feature upon feature is designed into this saw to assure long continuous service with low operating and maintenance cost . . . plus adjustable feed control for longer blade life. You have never seen such a value **before** for only \$350.00 complete with motor, f.o.b. Eau Claire, Wis.

Investigate the Keller No. 3CH today.

. . . The year's outstanding buy!

ONLY

\$350.00

F.O.B. Factory, Eau Claire, Wis.

Check These Specifications.

Capacity 6 $\frac{3}{4}$ x 6 $\frac{3}{4}$ inches.
Vise swivels to 45 degrees.
Capacity at 45 degrees, 3 $\frac{1}{2}$ in.
With automatic stop, elec. switch
Pressure feed control, 40 to 170 lbs.
Length of blade, 12 to 14 inches
Length of stroke 5 $\frac{1}{2}$ inches
Standard power blades used.
8 speeds avail., by shifting belts.
Automatic lift on reverse stroke.
Adjustable bronze bearings for guide bar in saw frame.
Oilite bearings throughout.
Motor, $\frac{1}{2}$ HP, 1750 RPM.
No. of strokes, 80-140 per minute.
Built-in coolant tank and pump.



NEW CATALOG . . .

showing the Keller 3CH and 9 other popular Power hack saws—capacity up to 9" x 9". Ask for your copy today!

THE CHOICE OF THOUSANDS — YOU'LL BE PROUD TO OWN ONE!

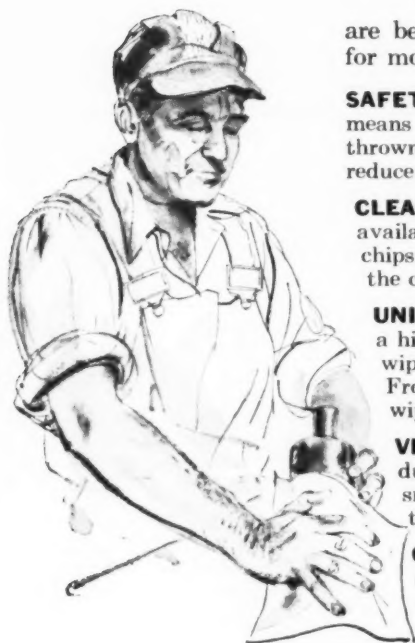
Sales Service Machine Tool Co.

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS

2357 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA



One demonstration, and key men agree NEW Scott Industrial Wipers



are better than anything they've ever used for most industrial wiping jobs. Here's why:

SAFETY—Scott Wipers are disposable. This means that harmful filings, oils, and shavings are thrown away with the used wipers. Clean edges reduce chances of catching in moving machinery.

CLEANLINESS—Because a clean one is always available, you can be sure of a wiper free from chips and foreign matter, thus helping eliminate the carrying of dermatitis.

UNIFORMITY—Every inch of every wiper is a highly effective wiping surface . . . and each wiper is of standard size, color and absorbency. From experience you will soon know the exact wiping requirements of each job.

VERSATILITY—Soft but strong, Scott Industrial Wipers tackle almost any job, big or small . . . from oil wiping and glass wiping to polishing and use on the face and hands.

COST CONTROL—Naturally, with sorting and counting eliminated, expensive controls are no longer necessary. Wiping now can be a budgeted production operation.

Most plants have found a 90-day trial—with a Scott representative working hand in hand with their supervisory personnel—the most accurate way of measuring the advantages of Scott Industrial Wipers.



For further information, fill out coupon and mail to Scott Paper Co., Chester, Pa.

Name

Position

Company

Address

City State

MT-A

NEW



Lehigh
TRACING TOOL

**PROFILE-TRACING
LATHE ATTACHMENT**

For ENGINE or
TURRET LATHES

**MULTIPLE O.D.
STEP TURNINGS**

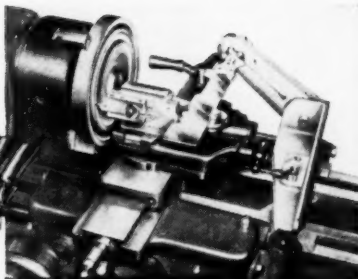
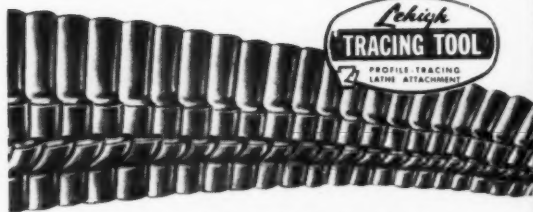
Turning 90° shoulders in the direction of the feed, or blending a shoulder with a radius, is possible on either I.D. or O.D. turning.

MAKES

precision duplicating

PRACTICAL and PROFITABLE

in any machine shop...



Does Lathe Duplicating with **PRECISION • ECONOMY** • **MINIMUM of ATTENTION**

Field checks since the introduction of Lehigh TRACING TOOL show an amazing variety of applications in shops of every size. This most versatile of tools seems to create its own opportunities for practical and profitable use. Using inexpensive and easily made templates, a Lehigh TRACING TOOL permits countless manufacturing economies and shortcuts — speeds production — opens new business channels — protects today's shrinking profit margins.

INSTALLED IN FIVE MINUTES

Removed just as easily

Does not tie up a lathe permanently — no alterations to the lathe are necessary.

- **WORK SIZE** — The model illustrated is designed to do all the work normally done with a $\frac{1}{2}$ " square tool bit. Larger sizes are available. Length of work controlled by length of the lathe.
- **INSTANT TOOL RETRACTION** — pre-loaded ball bearings also eliminate play and back lash.
- **CONSTRUCTION** — precision built, heavy duty. Tolerances as close as .0005 have been held.
- **TEMPLATES** — easily and inexpensively made from standard ground stock $\frac{1}{2}$ " x 2".
- **FOR LONG OR SHORT RUNS** — rugged enough for continuous runs. Ideal for short runs. Can be operated by semi-skilled labor once it is set up.

Write for fully descriptive folder.

only **\$375** complete

IN STURDY CARRY CASE FOR COMPACT STORAGE

AIR CONTROL
DIVISION OF

Lehigh
FOUNDRIES, INC.

1501 LEHIGH DRIVE • EASTON, PA.

Manufacturers of a complete line of

AIR VALVES • CYLINDERS • HOISTS

Precision Castings • Automatic Vending Machines
Commercial Refrigeration Systems and Units
Profile Tracing Lathe Attachments

QUICKLY SET UP FOR

MULTIPLE FACINGS

By turning Lehigh TRACING TOOL at right angles to spindle, it can be used for profile tracing.



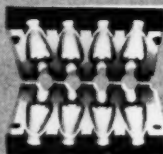
MULTIPLE O.D. TURNINGS

The Lehigh TRACING TOOL can be used for O.D. turning including tapers. It will make an .031 minimum radius and will turn an unlimited maximum radius.



MULTIPLE SHOULDER THREADINGS

Internal or external threadings, straight or tapered, can be made with Lehigh TRACING TOOL. Because of quick-retracting of cutting tool, thread can be cut close to a shoulder without danger of breaking tool.



MULTIPLE BORINGS

Boring and I.D. contours can be turned with Lehigh TRACING TOOL by same method as conventional O.D. turning. A 90° stop can be cut in the direction of the feed.

... now
L&I adds

**KING
SIZE**

to its
broader
range
of
STANDARD
reamers

LEE & IDE, INC.

L&I Chucking Reamers
in both Wire Gauge and Letter
Sizes are now **STANDARD** in long
exchanges include: Dorel Pin Reamers,
Right Hand Spiral Flute Reamers in
Wire Gauge Sizes. Complete line of
left, too. L&I King Size Reamers
nearby Production.



*The
Reamer
Specialists*

LAVALLEE & IDE, INC.
CHICOPEE, MASS.

District Managers **MACHINE and TOOL BLUE BOOK**

NEW ENGLAND and EASTERN N.Y. STATE

Dan E. Reardon
Box No. 1
South Glastonbury, Conn.
Telephone: GLastonbury 3-7083

NEW YORK METROPOLITAN AREA

Dan E. Reardon
Martin J. Gallay
c/o Hitchcock Publishing Co.
55 W. 42nd Street
New York 36, N.Y.
Telephone: LACKawanna 4-4528

PENNSYLVANIA, NEW JERSEY, BROOK- LYN, N.Y., SOUTHERN N.Y. STATE, DELAWARE, MARYLAND

Raymond J. Sietsema
c/o Hitchcock Publishing Co.
55 W. 42nd Street
New York 36, N.Y.
Office Telephone: LACKawanna 4-4528
Home Telephone: VERona (NJ) 8-3072

WESTERN N.Y. STATE, WESTERN PENNA., N.E. OHIO

Ralph E. Helfrick
1507 Edgefield Rd.
Cleveland 24, Ohio
Telephone: HILlcrest 2-0189

OHIO, EASTERN MICHIGAN, INDIANA, KENTUCKY

Henry J. Smith
3529 Radcliffe Rd.
Cleveland 21, Ohio
Telephone: EVERgreen 2-2520

MIDDLE WEST, WESTERN MICHIGAN

James C. Stewart
222 E. Willow Ave., Wheaton, Ill.
Telephone: WHEaton 8-3400

CALIFORNIA & ARIZONA

Keith H. Evans
3757 Wilshire Blvd.
Los Angeles 5, Calif.
Telephone: DUNKirk 8-2981
Room 304, 593 Market Street
San Francisco 5, California
Telephone: YUKon 2-4280

OREGON & WASHINGTON

Lloyd Thorpe
604 Medical Arts Building
Seattle 1, Washington
Telephone: MAIn 6827

HITCHCOCK PUBLISHING CO.
WHEATON, ILLINOIS
Telephone: WH 8-3400

FIRST CLASS
PERMIT NO. 272
SEC. 34.9, P. L. & R.
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

2c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

FIRST CLASS
PERMIT NO. 272
SEC. 34.9, P. L. & R.
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

2c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION
WHEATON, ILLINOIS

NOVEMBER, 1953

Please send information on NEW PRODUCTS described on the following pages:

.....
.....

Please send data on the items ADVERTISED on the following pages:

.....
.....

Please Print

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION
WHEATON, ILLINOIS

NOVEMBER, 1953

Please send information on NEW PRODUCTS described on the following pages:

.....
.....

Please send data on the items ADVERTISED on the following pages:

.....
.....

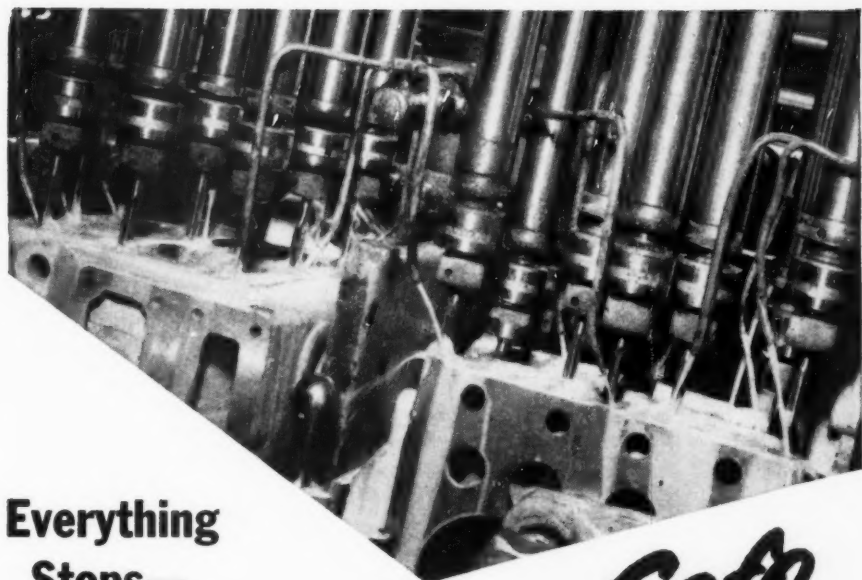
Please Print

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....



**Everything
Stops—**

**If One Tap
Fails!**

Play Safe

Specify

**BESLY
TAPS**

You don't take a chance when you use Besly Taps in your multiple tapping operations because you can be sure of uniform threads and long, dependable tap life. There's less expensive down-time to change taps; material and labor isn't wasted because holes are being improperly tapped.

LET US PROVE TO YOU . . .

that Besly Taps can give you better tapped holes . . . for a longer time on *any* tapping operation. Ask for a free TRIAL RUN on your toughest jobs and see for yourself what Besly Taps can do.



**BESLY-WELLES
CORPORATION**

Established as Charles H. Besly & Co. in 1875
122 Dearborn Ave., Beloit, Wisconsin



TAP TIPS The handy "Handbook for Tap Users" is full of information on tapping methods and tap selection. **WRITE FOR YOUR FREE COPY.**

UNSURPASSED ACCURACY AT ALL VITAL POINTS



Microcentric
CHAMFER



Accurate RAKE ANGLE



Solid-Ground
THREAD FORM



Mirror-Finish
FLUTES



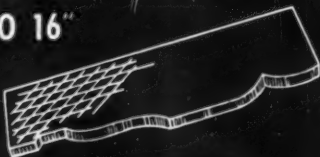
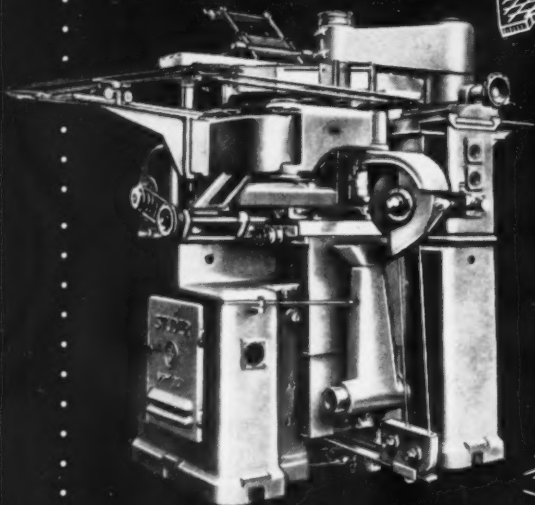
Tri-Square DRIVER

BESLY Drills, Reamers and End Mills—High-Speed Cutting Tools in a complete range of types and sizes.

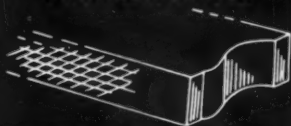
THE STUDER PSM-250

GRINDS PROFILES UP TO 16"

IN ONE SETTING



LARGER
FLAT OR CIRCULAR
FORM TOOLS,
SECTIONAL DIES,
GAUGES AND OTHER
PROFILE PARTS
CAN NOW BE
ACCURATELY GROUND
ON THIS
**NEW
STUDER**
PROFILE GRINDER

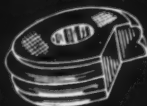


INCREASED CAPACITIES

The PSM-250 grinds profiles up to 16" long in one setting and accepts flat work pieces up to 4 1/4" thick and rounds up to 10" diameter. Templates up to 24" long are easily accommodated. The adjustable pantograph can be set in any ratio from 1:1 to 1:10.

CLEARANCE ANGLE AND RELIEF GRINDING

Attachments are available to grind different clearance angles on flat form tools—without correcting template form; and, to relief-grind punching and drawing dies.



AUTOMATIC TRACER GUIDE

This attachment automatically guides tracer bar along the template. The automatic, uniform feeding produces improved surface finishes and increases the life of grinding wheels. To guide tracer bar by hand, two screws are loosened to detach the device.

PRECISE GRINDING

Profiles can be ground to a tolerance of ± 0.0004 ". Closer limits are obtainable when large ratios of reductions are employed.

WRITE FOR CATALOG ILLUSTRATING AND DESCRIBING THE NEW STUDER PSM-250

COSA CORPORATION
403 Lexington Ave., New York 17

Your source for all Precision Machine Tools—
from Small Bench Lathes to Large Boring Mills

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.

F R O R I E P

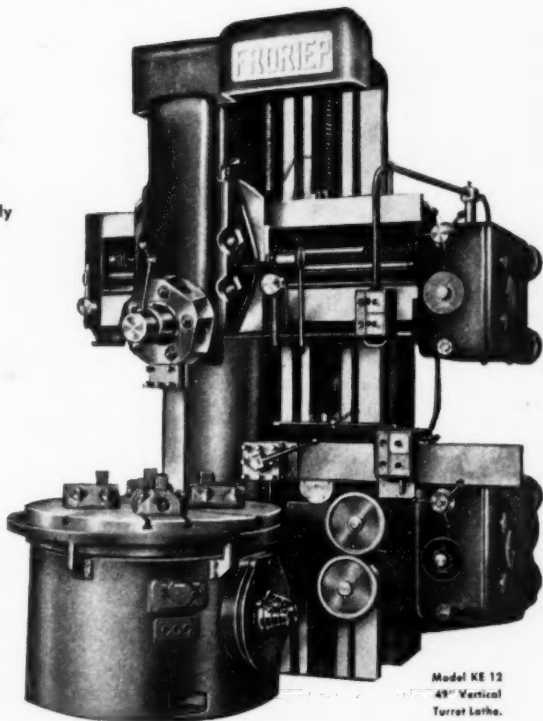
VERTICAL TURRET LATHES

for • • • High Cutting Capacity
• Quality Surface Finishes
• Convenience of Operation

The rigid construction and ample range of speeds provide for maximum cutting efficiency with either carbide or high speed tools. Down time is minimized as all controls are centrally and conveniently located. Fine adjustments for cutting tools are so placed that operators can closely observe cutting edges—even on small workpieces.

The Foriep Vertical Turrets are made in four sizes having 39", 49", 55" and 63" diameter tables. They can be furnished with thread cutting equipment, taper turning equipment, tripping device, tracing device with electric tracer control and coolant system.

Write for catalog fully describing these Vertical Turret Lathes.



Model KE 12
49" Vertical
Turret Lathe.

COSA CORPORATION

405 Lexington Ave., New York 17

Your source for all Precision Machine Tools—
from Small Bench Lathes to Large Boring Mills

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.



Cutting Hard-Tempered
1/8" Chrome Moley Steel



Sawing 16" Steel Piling

Greatest Cost Saver in METAL CUTTING



FRiction sawing with Tannewitz High Speed Band Saws results in perfectly amazing time savings in the cutting of flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics, many other materials and the trimming of castings. For cutting formed parts there's nothing to compare with it. The down-drag of the saw is so negligible that parts may be trimmed or sawn as desired without using a rest of any kind. Whatever your cutting requirements, chances are they can be handled faster and at less cost with Tannewitz High Speed Band Saws.

THE TANNEWITZ WORKS
GRAND RAPIDS, MICHIGAN



GL-6-1729

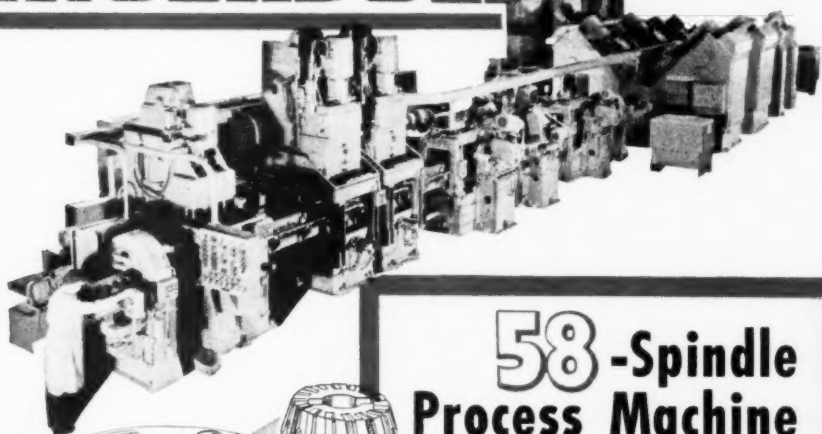
**FRICION
SAWING**



*Write for Your
Free Copy on Friction
Sawing*

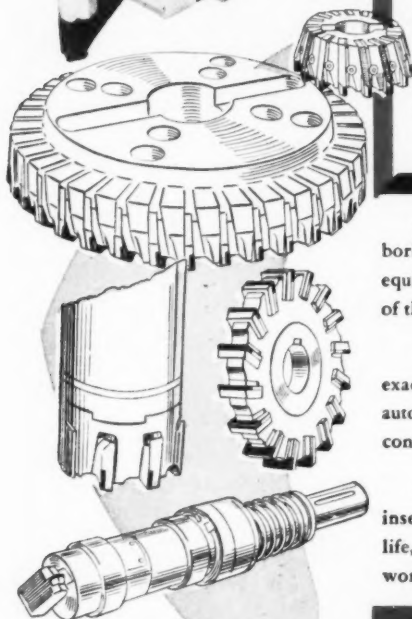
with
Tannewitz
HIGH SPEED BAND SAWS

INGERSOLL'S *NEWEST*



58-Spindle Process Machine

MILLS AND BORES 90 AUTOMOBILE
CYLINDER BLOCKS PER HOUR



Seven kinds of milling cutters, together with boring tools and chamfering bars, fixtures and transfer equipment, were built by Ingersoll as integral parts of the process line pictured above.

Working with our machine designers to meet exacting production and accuracy requirements of the automobile industry, Ingersoll's cutter engineers are continually improving basic tool designs.

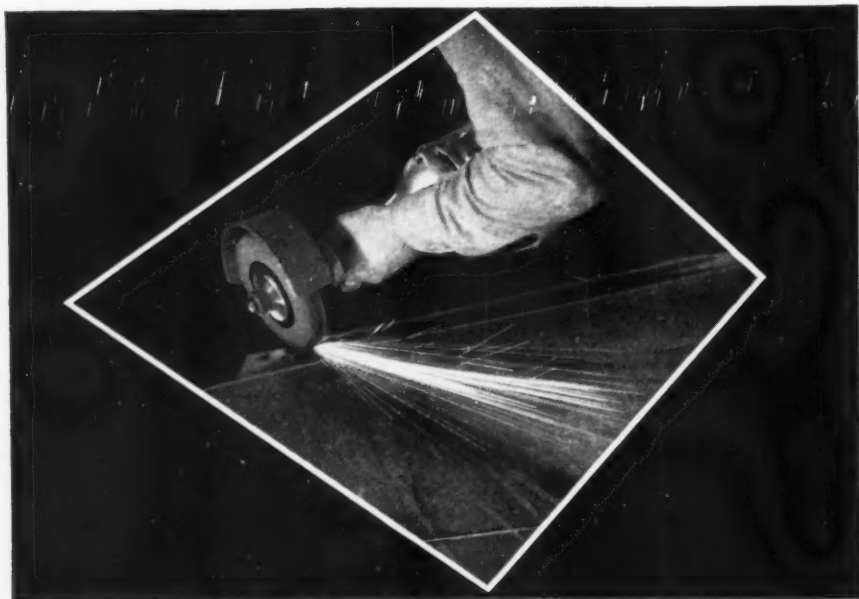
Application of these advances to our standard inserted blade cutters makes higher feeds, longer tool life, and increased production available for all kinds of work on all makes of milling and boring equipment.



Write for

NEW INGERSOLL
Cutter Catalog 60E

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS, U. S. A.



Manhattan Portable Wheels—

More use per dollar

DESIGNED BY YOU . . . Manhattan Portable Wheels are built to solve the specific problems encountered in your plant . . . to remove *more* metal . . . *faster* . . . at *lower* cost. Yes, the type of abrasive, grain size, hardness, structure and bond of the Manhattan Portable Wheel you buy are determined by the specific requirements of your work . . . by a careful analysis of *your* needs.



This is typical of Manhattan service . . . of Manhattan Abrasive Wheels . . . built with the job in mind. The result—uniform quality, longer life, and more output per man-hour. You get **MORE USE PER DOLLAR** when you specify "Manhattan".

WRITE TO ABRASIVE WHEEL DEPARTMENT



MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles • Teflon Products • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

MR-940R

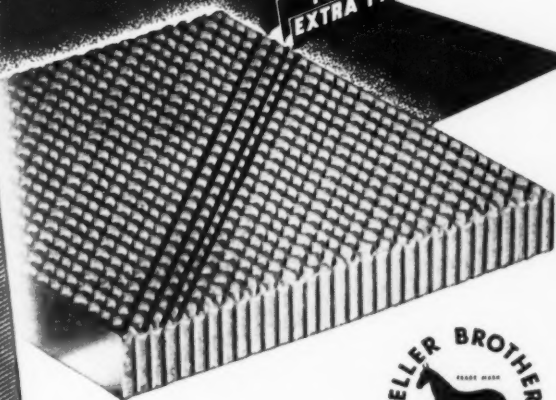
**Half the time
with Heller NUCUT
wavy teeth**

Coarse, fine and extra-fine
teeth all combined on one file for fast, deep, double-
action cutting. Even, scratch-free finish. No chatter-
ing. Longer file life. **ORDER FROM YOUR**

LOCAL DISTRIBUTOR

Notice NUCUT patented tooth
arrangement in this greatly
enlarged section.

**COARSE
FINE
EXTRA FINE**



**look
for the
white
tang**



450CZ



THESE THREE FAMOUS FILES ARE
MADE ONLY BY HELLER BROTHERS

HELLER BROTHERS COMPANY

America's Oldest File Manufacturer
NEWCOMERTOWN, OHIO



GET

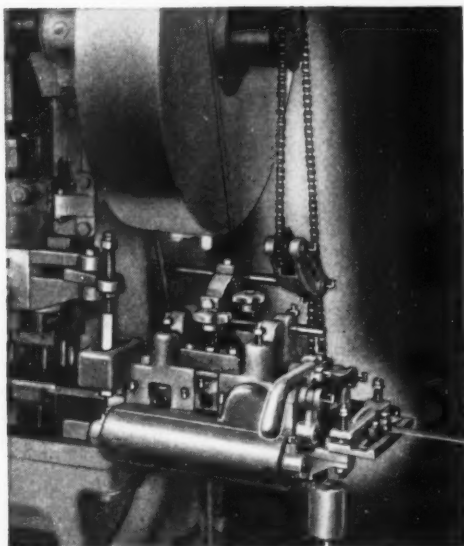
RAPID-FIRE PRODUCTION

from your PUNCH PRESSES

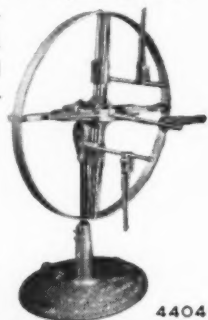
IT'S EASY WITH

WITTEK

Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

WITTEK Reel Stands

Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

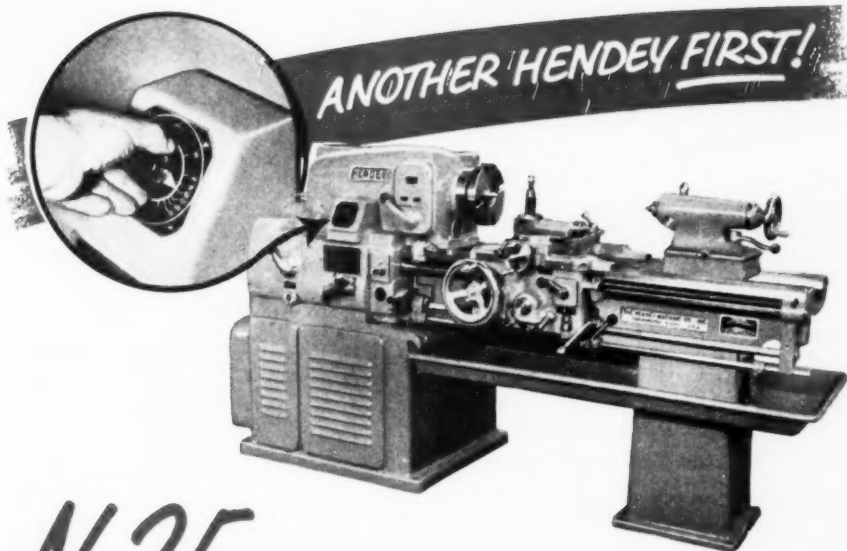
Write for full particulars

WITTEK Manufacturing Co.

4321 W. 24th Place, Chicago 23, Illinois

Automatic
ROLL FEEDS AND
REEL STANDS





No. 2E general purpose precision lathe WITH ELECTRONIC MOTOR CONTROL

Hendey, pioneer in "quality," introduces another *first* — a new 14" precision general purpose lathe with infinitely variable spindle speed control to 1500 R.P.M. Because of this outstanding feature the No. 2E offers broad opportunities to increase efficiency and lower turning costs, with operator effort reduced to a minimum.

Effortless control by one convenient fingertip selector smoothly adjusts spindle speeds through the full range from 15 to 1500 R.P.M. Adjust under cut or pre-set to the most efficient speed . . . it's that simple. The Hendey proved electronic control of the drive motor takes over the effort . . . responds to the operator's every spindle speed requirement. Instantaneous electric dynamic spindle braking plus start, stop, and reverse are one-lever controlled at the headstock and apron.

Add to this . . . induction hardened and precision ground bed-ways . . . reverse to the lead screw . . . automatic lubrication . . . 48 feed and thread changes . . . sturdy V-type cross ribbed bed . . . convenient grouping of operating controls . . . plus traditional Hendey built-in quality and precision.

Write for detailed specifications.

the *Hendey* machine co., inc.
torrington, conn., u.s.a.
—precision machine tools—



distributors in principal cities

**INCREASES
PRODUCTION...**

LOWERS COSTS...

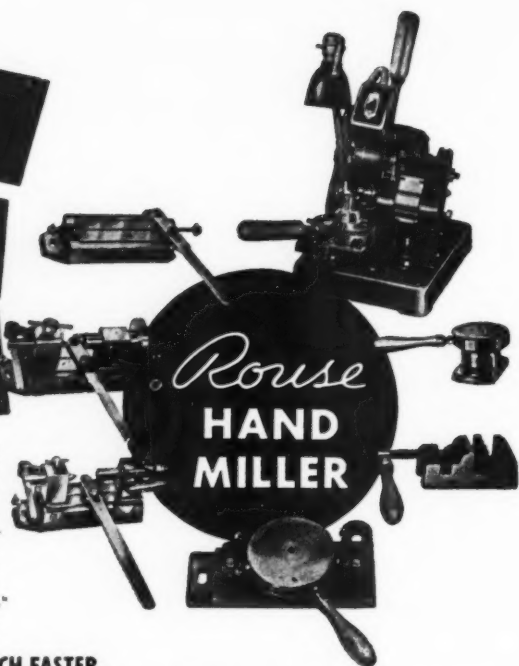
**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastic, and other materials—fast, accurately, and at very low cost. Only \$106.00*.

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$ H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light — \$33.00*.

*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$106.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

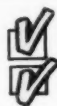
**Write today
for further
information.**

H. B. ROUSE & COMPANY

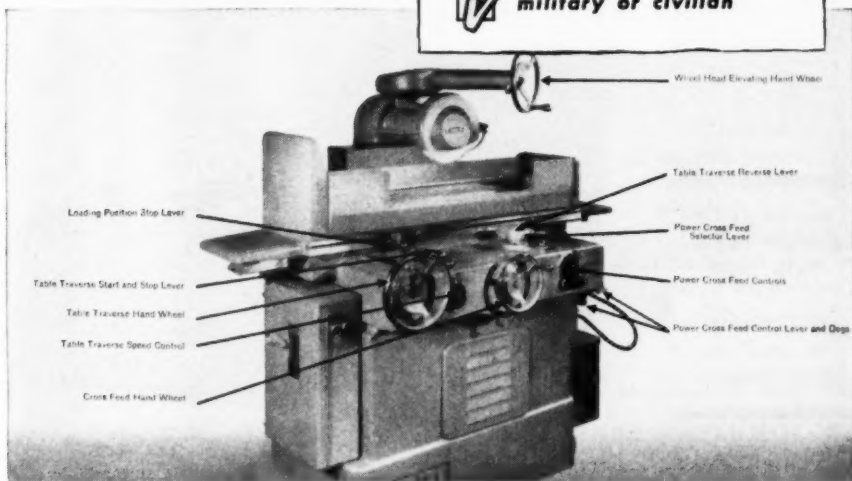
2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

Easy to set up... Easy to operate...

This 8" Norton Surface Grinder gives you the
"TOUCH OF GOLD"
on all kinds of jobs!



production or tool room
military or civilian



NOTE SIMPLICITY AND CONVENIENT GROUPING of controls on the Norton 8" x 24" surface grinder. Quick set-up cuts your unit costs . . . makes "breaking in" of new production help far easier. It gives you the "Touch of Gold".

Here's a rugged machine that sets up quickly for a production run, maintains accuracy on quantity parts, and is also efficient for grinding various small tool room jobs.

As with all Norton Grinding Machines, every touch of its wheel brings the "Touch of Gold" that gives you more value and profits.

Remember — Norton offers you the longest experience in both grinding machines and wheels to help you produce more at lower cost.

See your Norton Representative about this great new grinder. And write direct for

catalog No. 190. NORTON COMPANY, Machine Division, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

To Economize Modernize With NEW



GRINDERS and LAPPERS

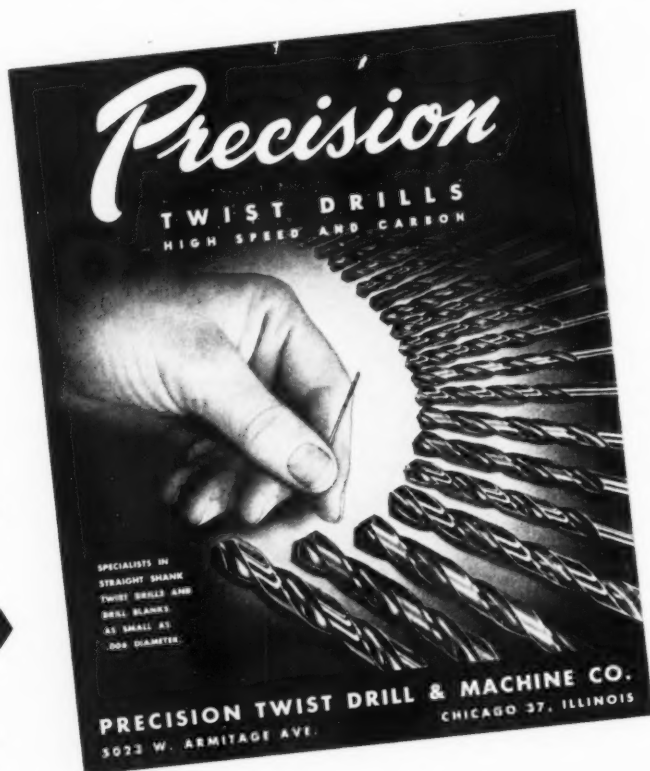
Making better products to make other products better

District Sales Offices:
Hartford • New York • Cleveland • Chicago • Detroit

For the Finest Small Twist Drills

Specialists in
Straight Shank
Twist Drills

Drill Blanks
as small as
.006 Diameter



Write for this New Catalog and Price List

"Any Precision made drill or tool must not only be entirely satisfactory to you, but must prove to be the most economical you have ever used or it can be returned for full credit."

THIS IS OUR GUARANTEE!

PRECISION TWIST DRILL & MACHINE CO.

5023 W. ARMITAGE AVE.

CHICAGO 37, ILLINOIS

SOME DESIRABLE TERRITORIES OPEN FOR DISTRIBUTION

Because your Blanchard Grinder deserves the best

USE BLANCHARD GRINDING WHEELS



25 years of experience in building both grinders and wheels puts Blanchard in a unique position to give you the best results in surface grinding. There is a *correct* Blanchard Wheel for your work, whether it is as tough as copper or fragile as glass — whether it involves long or short runs — whether it demands heavy stock removal or finishes to 1 microinch — whether it requires clean-up cuts or flatness to .000005"! Top economy and production result only when you use the correct wheel for each individual job. Your nearest Blanchard representative will be glad to put his experience to work for you.



THE BLANCHARD MACHINE CO., 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Also investigate THE BLANCHARD CYLINDER WHEEL HOLDER!

This new device eliminates sulphuring and thus reduces down-time. It's a real time, money and trouble saver. Grinder head is merely lowered onto wheel — clamps quickly secure the wheel — you're ready to grind! Available for 10", 11", 16", 18" and 20" Blanchard Wheels.



COUPON

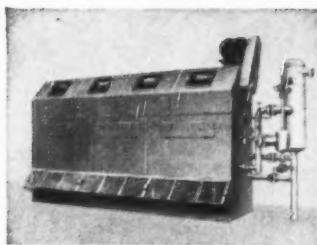
Please send free copy of Blanchard Wheel Booklet and Wheel Holder Folder.

NAME _____ TITLE _____

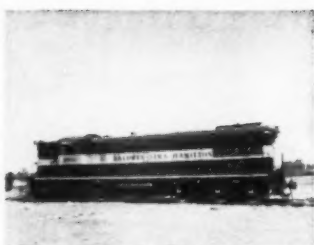
COMPANY _____

STREET _____

CITY _____ STATE _____



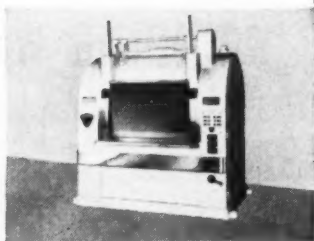
**INDUSTRIAL AIR
CONDITIONING UNITS**
York Corporation
York, Pa.



LOCOMOTIVE PARTS
Baldwin-Lima-Hamilton
Corp., Eddystone, Pa.



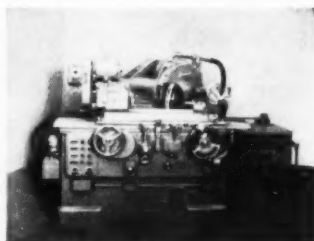
TRUCK COMPONENTS
The Autocar Company
Ardmore, Pa.



BAKERY MACHINERY
Baker Perkins, Inc.
Saginaw, Mich.



INDUSTRIAL TRUCKS
Automatic Transportation
Company, Chicago, Ill.



**MACHINE TOOL
COMPONENTS**
Norton Company
Worcester, Mass.

You too

can
eliminate
layout and
set-up
and reduce
handling time
with a

**WIEDEMANN
TURRET
PUNCH
PRESS**

These are just a few who do!

ASK FOR A TIME STUDY

WIEDEMANN MACHINE COMPANY

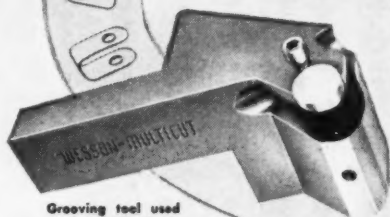
4265 Wissahickon Avenue, Philadelphia 32, Pa.

Specialists in Designing and Producing Carbide Cutting Tools

WESSON BAND
TYPE

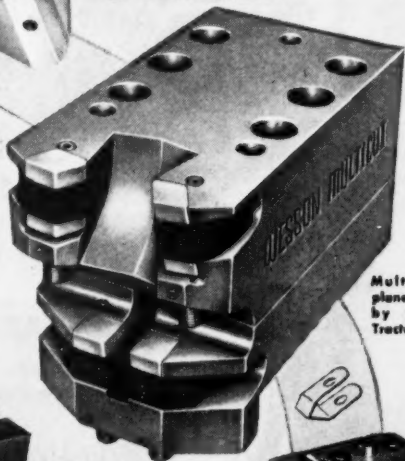
TOOL HOLDERS

Special and Standard
with replaceable bands
at low cost.

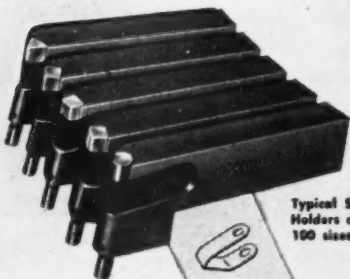


Grooving tool used
on the Cadillac Tank.

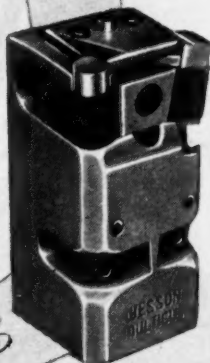
**ALL THE WEAR ON
THE BAND MEANS
EXTRA ECONOMY, EXTRA
EFFICIENCY, HOWEVER
SIMPLE OR COMPLICATED
YOUR TOOL HOLDER
PROBLEM!**



Multiple insert
planer tool used
by Caterpillar
Tractor.



Typical Standard Wesson Tool
Holders available in 10 styles,
100 sizes.

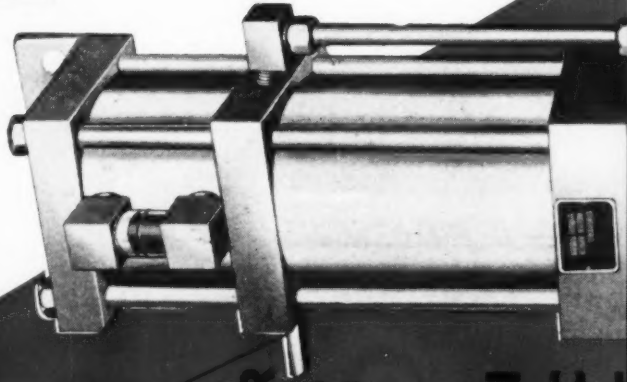


2 insert tool for turn-
ing Ford-Lincoln rear
axle shaft on a Bul-
lard Man-au-trol.

WESSON
Carbide Cutting Tools

First choice when tough metals are to be cut—
for special or standard purposes—
for single or multiple set-ups.

WESSON COMPANY 1220 Woodward Heights Boulevard
FERNDALE (DETROIT 20) MICHIGAN
Affiliated with WESSON METAL CORPORATION, Lexington 34, Kentucky



FLUID PRESSURE BOOSTERS

- Save space, weight and investment cost by replacing pump installations in many applications
- Less costly to install, operate and maintain
- **Hold pressure indefinitely** without the motion and heat generation of ordinary pump circuits
- Provide—at point of cylinder thrust—more efficient power with less weight in less space than direct driven air cylinders
- Save up to 95% of air consumed by direct driven air cylinders
- Operate at speeds of 30 to 450 strokes per minute



BOOST
80 PSI AIR
Input Range: 40 to
3000 psi Air or Fluid
TO
2000 PSI
HYDRAULIC
PRESSURE



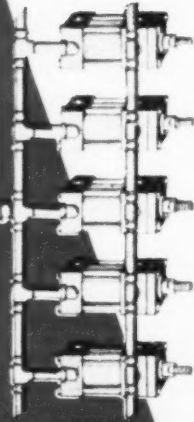
Output Range: 200 to
10,000 psi Fluid



ESPECIALLY RECOMMENDED FOR

- WELDING
- PUNCHING
- SHEARING
- CLAMPING
- RIVETING
- CRIMPING
- PRESSING

and similar applications



FULL DETAILS IN MILLER BULLETIN B-200 SENT FREE ON REQUEST
Other Miller products include: Air cylinders, 1½" to 20" Bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.



SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • PITTSBURGH • PHILADELPHIA •
BOSTON • HARTFORD • NEW YORK CITY • BUFFALO • ST. PAUL • GRAND
RAPIDS • DETROIT • FLINT • FORT WAYNE • SOUTH BEND • INDIANAPOLIS
• MILWAUKEE • LOUISVILLE • KANSAS CITY • SEATTLE • LOS ANGELES •
SAN FRANCISCO • DENVER • ST. LOUIS • MOBILE • CHICAGO
• HOUSTON • TORONTO, CANADA and OTHER AREAS

MILLER MOTOR COMPANY

2026 N. Hawthorne Ave., Melrose Park, Ill.

COUNTERBALANCE SYSTEMS

SOUTH BEND Drill Presses



for Efficient Production



South Bend precision-built drill presses have many features which help reduce the cost of production machining. Their accuracy and sensitive handling make them ideal for small work requiring close tolerances. And their rugged construction gives long, dependable service on tough jobs. Built with typical South Bend quality and skill, each model is an outstanding value.

14" Precision Model Drill Presses—Maximum drill size $\frac{1}{2}$ " in iron or steel. Four spindle speeds 720 to 4325 r.p.m. approx. Belt tension release lever. Spindle run-out .001" max. Built-in shielded light. Free-floating spindle. Quill bearing tension adjustment. Four precision ball bearings.

14" Economy Model Drill Presses—Capacities and speeds same as above. Spindle run-out .003" max. Free-floating spindle.

Production Model Drill Presses—1, 2, 3 or 4 spindle models. Each head has independent vertical adjustment. Supplied with or without coolant equipment.

**Can I get it?
When? How?**

Yes—you can get most any South Bend product immediately from our distributor's stocks in principal cities. Items not stocked shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

SEND INFORMATION CHECKED:



☐ 9" and 10" BENCH LATHES



☐ 10" to 14-24" FLOOR LATHES



☐ DRILL PRESSES



☐ TOOL GRINDERS



☐ $\frac{1}{2}$ " & 1" Collar TURRET LATHES



☐ 7" BENCH SHAPERS

Name _____ Company _____

Street _____ City & State _____



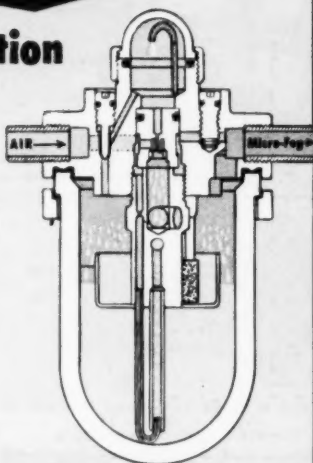
Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

now...

Norgren

MICRO-FOG

for multiple-bearing lubrication



**lubricate up to 40 bearings
with one Micro-Fog Lubricator**

Now, the advantages of Micro-Fog Lubricators have been extended to applications on bearings, gear boxes and small air-operated devices. It produces an extremely fine and uniform air-borne Micro-Fog at low air flow; transmits it over greater distances than previously possible; distributes it evenly thru as many as 40 outlets; provides exact control and uniform rate of oil feed.

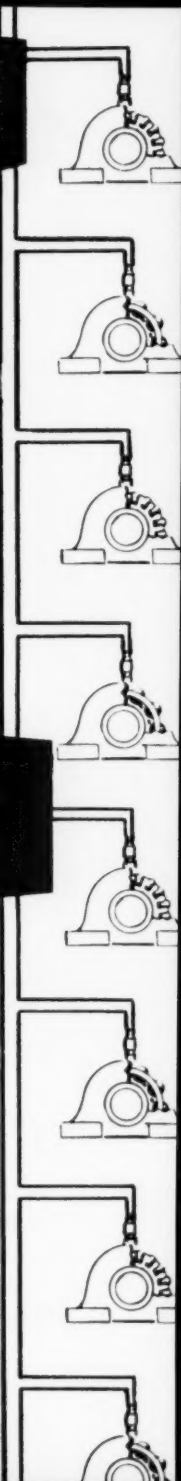
WRITE FOR NEW CATALOG SHEET NO. 485

PIONEER AND LEADER IN OIL FOG LUBRICATION FOR 25 YEARS

- LUBRICATORS
- VALVES
- REGULATORS
- HOSE ASSEMBLIES
- FILTERS

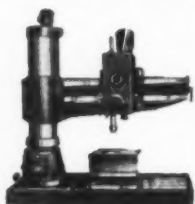
C. A. *Norgren*[®] CO.

3438 So. Elati St., Englewood, Colorado

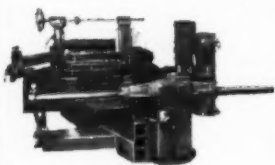


NEW MACHINE TOOLS

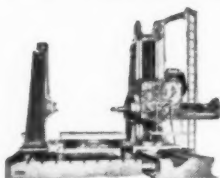
MANUFACTURED BY LEADING MACHINE TOOL BUILDERS



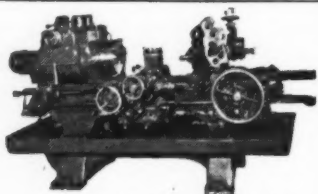
Radial Drills—2', 3', 4', 5', 6', 7', 8', and 10'.



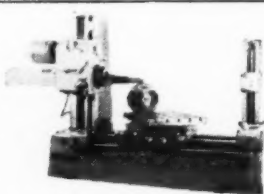
New Slitters, All Sizes, with Coilers and Recoilers.



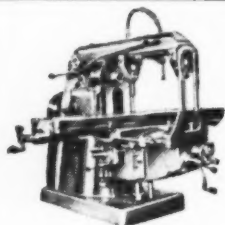
Horizontal Boring Mills, Table & Floor Type, up to 10'; Rotary Tables of Desired Sizes Available.



Ram & Saddle Type Turret Lathes, Nos. 3, 4, 1A, 2A, 3A. Also 40E Automatic Electro-Cycle.



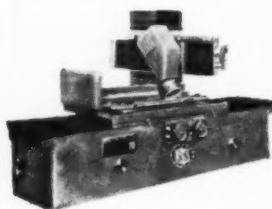
S&S 3" Boring Mill, Built-in Rotary Table, 70" to Outboard, 31½" Spindle to Table, Available up to 92" to Outboard, 48" Spindle to Table.



No. 4 Di Palo Dial Type High-Speed Plain Milling Machine Available. Also: Nos. 2, 3, 4, 5, 6, 10, Plain, Universal & Vertical.



S&S No. 2 Miller, Universal or Plain. Longitudinal Travel—31½". Spindle to Column—35". Available with Motorized Over-arm Attachment.



New S&S Precision Openside Hydraulic Grinder: Surface, Vertical & Angular. Sizes up to 40"x40"x96".

Leading American and European Machine Tool Manufacturers displaying over 1000 Advanced Machines under power at the

**1st INTERNATIONAL
Machine Tool Exposition**
132 54th St., Brooklyn, N.Y.

Don't Miss It!

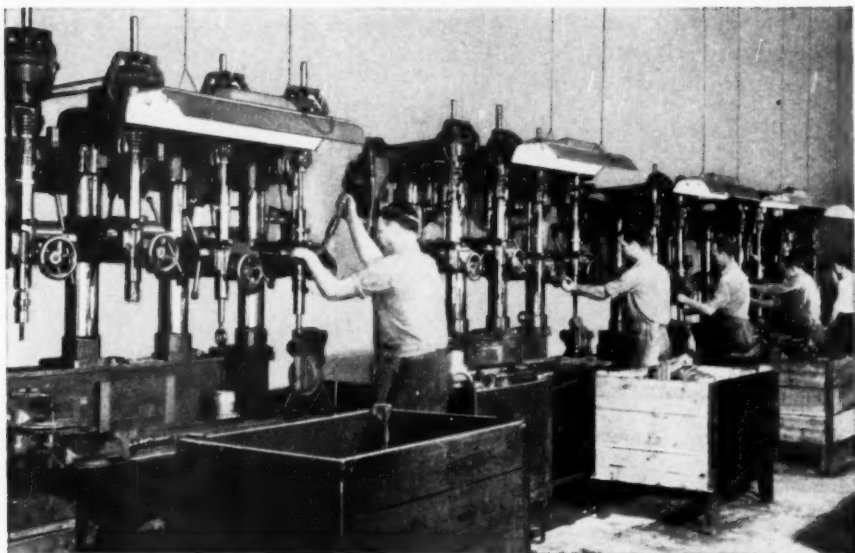
EXCLUSIVE



DISTRIBUTION

S & S MACHINERY CO.

132 53rd Street • Brooklyn 32, N. Y.
Phone: HYacinth 2-7400 • Cable: SANDSTOOLS



EASY WAY To Hit Peak Production!

In this well-known meter plant, as in hundreds of efficient shops, they're jacking up drilling output this simple way: install the easy-handling multiple spindle "Buffalo" Drills your operation requires. You not only eliminate waste setup motions, but you get better accuracy, less worker fatigue and longer drill life.

In the photo above, the men on the four-spindle "Buffalo" No. 22 Drills are able to set up as many as four different drilling, tapping and reaming operations. Production flows right down the line easily and with minimum delays between operations. All controls and adjustment cranks are easily reached, so that these large-capacity machines are as easy to handle as smaller sensitive drills. Let us recommend a drilling arrangement to help cut your drilling time and cost!

MULTIPLE SPINDLE

"Buffalo"

**No. 22
DRILLS**

BUFFALO *"Buffalo"* **FORGE COMPANY**
MACHINE TOOLS

161 Mortimer St.

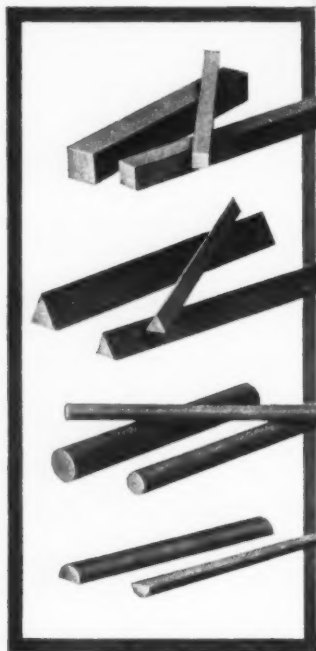
Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING CUTTING SHEARING BENDING

**THAT EXTRA
TOUCH BUILDS...**

*higher quality
in your work*



**INDIA® and HARD ARKANSAS®
OILSTONE FILES**

For real precision work-fitting dies and machine parts, deburring, radiusing, chamfering and touching up cutting-tool edges — there is nothing to equal hand stoning. INDIA and HARD ARKANSAS files, shaped to conform to the work surfaces, enable you to do a quick stoning job to meet close tolerances. INDIA files, of tough, hard electric-furnace abrasive, are favored for general "quick touch-up" work, while HARD ARKANSAS, a fine textured natural stone, gives you the ultimate in "superfine" edges and finishes.

For Export: Norton Behr-Manning Overseas Inc.,
New Rochelle, N. Y., U. S. A.

In Canada: Behr-Manning (Canada) Ltd., Brantford.

Catalog 19 gives complete data on the more than 200 sizes, shapes and grits available. Write Behr-Manning, Troy, N. Y., Dept. B-11.

® *Trade-Marks

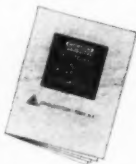


BEHR-MANNING

CORPORATION

division of NORTON Company

▲ COATED ABRASIVES ▲ SHARPENING STONES ▲ PRESSURE-SENSITIVE TAPES



TAPPING ATTACHMENTS

Tested for Performance to High American Standards

Immediate delivery from New York stock

MADE IN GERMANY

Prices lower than comparable
domestic products

Reversible safety tapping attachments with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout by long established, reputable West German factory.



Our headquarters
in New York City

Write for complete details and prices to Dept. 200

M.B.I. EXPORT & IMPORT LTD.
475 Grand Concourse, Bronx 51, N.Y.

"Over 20 years experience in designing & building machinery"

CABLE ADDRESS: Machbuild New York
Phone: MOtt Haven 5-0900

- Multi Purpose Vises
- Quick Change Chucks & Collets
- Wile-Grip Keyless Drill Chucks
- Milling Machine Arbors, Adapters, Arbor Spacers & Bearings
- Lathe Mandrels

**DISTRIBUTOR INQUIRIES
INVITED**

(Some exclusive territories
available.)

Also Exclusive United States
Distributors of European
Machines for every operation





Test any stock size 30 days—subject to return if it hasn't proven itself to your satisfaction.

Make Man-Power More Productive!

NOW—Higher wages and urgent government orders make production short-cuts more vital than ever.

Glenzer FLOATING TOOL HOLDERS automatically correct misalignment within $\frac{1}{32}$ " radius or $\frac{1}{16}$ " diameter — save all the time formerly needed for adjustments on old or new machines.

Your old worn machines can still produce perfectly aligned work by adding these Floating Holders. Your own time studies will quickly prove their savings — and watch the reduction of your rejects!

THE J. C. **GLENZER** CO. Inc.

1546 E. NINE MILE ROAD, DETROIT 20, MICH.



INERT-ARC WELDER—Combines instant starting, smooth and stable arc, compactness, and portability.

Viking—the name synonymous with welding know-how—gives you a **PRODUCTION-ENGINEERED** welder line for all your needs.

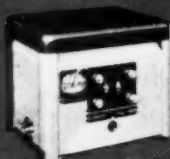
Viking welders are famous for their smooth, **STABLE** arc. Carefully designed—ruggedly built—rigidly inspected, Viking welders do the job economically and effectively.

Viking engineers and distributors are well qualified to assist you in determining the right equipment for your jobs—or in converting your present equipment to high-frequency or inert-arc welders.

- ★ **INERT-ARC**
- ★ **AC METAL-ARC**
- ★ **DC RECTIFIER**
- ★ **RAD-ARC-TROL**

AC METAL-ARC WELDER—Patented design features high duty cycles without cooling fans, minimum "no-load" loss, smooth and stable arc. Available in models from 130 to 600 amp capacity.

DIRECT CURRENT SELENIUM RECTIFIER WELDERS—The latest development in direct current welding equipment. No moving parts—low maintenance.



RAD-ARC-TROL—An automatic high-frequency arc starter and stabilizer for use on **ANY** MAKE of AC or DC welder. Model MR is used for light gauge metallo-arc welding. Model MSD converts your present welder to the Inert-arc Process. The gas regulating attachment is included in the unit.

WRITE FOR COMPLETE INFORMATION ON ALL VIKING WELDERS

Viking

**DIVISION OF
PROGRESSIVE WELDER SALES CO.**

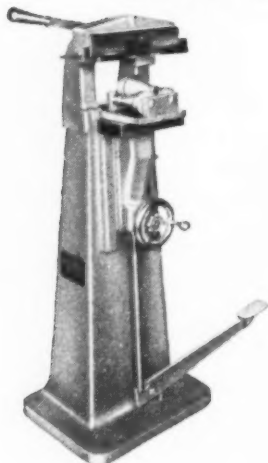
3040 EAST CANTON DRIVE • DETROIT 34, MICHIGAN

To Prove Their Valor Redskin Warriors Used Marking Devices

In the Frontier Days, Indian warriors used painted or decorative marking devices to indicate their prowess and to show how many or what kind of coups they had performed.



CADILLAC 115 HAND MARKING MACHINE



GENERAL PURPOSE FLOOR TYPE HAND MARKING MACHINE

Marks: Flat or Round Parts...Parts of Varying Thickness
Rolling Operation for Marking Requires Minimum Pressure

This machine is ideal for many light marking operations and short run jobs . . . its simple construction permits easy changes from one marking operation to another — thereby reducing down-time. Simple fixtures generally suffice for locating parts to be marked . . . specifications for fixtures can be readily met.

Dangers of distortion and fracture are minimized — pressures reduced to barest minimum because this machine rolls the impression into the part.

For full information write for Bulletin L-115

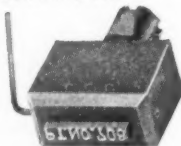


ROLL TYPE HOLDER

Depending on requirements, can be had for either solid or interchangeable type.

MARKING MACHINE AND PUNCH PRESS HOLDERS For Interchangeable Type

Made of alloy tool steel, all are furnished with a replaceable platen—hardened and precision ground.



For full information, write for Bulletin SE-130

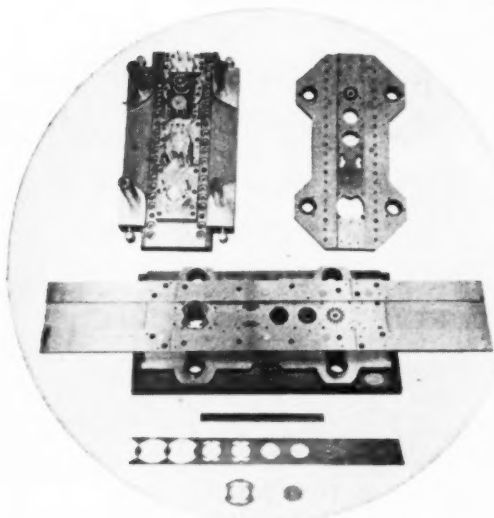
CADILLAC STAMP CO.

FACTORY and OFFICES

17321 RYAN ROAD • DETROIT 12, MICH.

This die was not just "made"...

it was ENGINEERED



Let's take a close look at this die: All die sections are mounted in a hardened nickel-chrome frame for maximum production and die life; the die set was specially made by Moore. The spring stripper is guided on four main posts. High-speed inserts are set into hardened steel frames.

Moore produced all parts of the die to figures instead of to "fit." This was done concurrently by several toolmakers instead of progressively as a slow, one-man job.

Precision Hole Location and Contour Grinding Methods Assure Accuracy, Speed, Economy

THE NO. 2 MOORE JIG BORER bored all holes before hardening, thus holding the location as close as possible to eliminate excessive grinding. With its built-in system of accurate lead screws, the Moore Jig Borer can spot, drill, bore or ream all holes in a workpiece with minimum tool changes and to close tolerances.

Punches and dies of the first station—at the right in the photograph—were ground with a Moore Panto-Crush Wheel Dresser. This machine, which combines roll-crushing and diamond dressing, did the required linear contour grinding quickly and effi-



No. 2 MOORE
JIG BORER

Just a choice of words, you say? No, it's more than that. The progressive steel lamination die shown here was hole-bored, hole-ground and contour-ground to pre-engineered dimensions entirely on Moore-built machines in the Moore toolroom. It exemplifies the application of engineering principles that put die-making on an interchangeable parts-and-assembly basis for the first time.

ciently. Moore Motorized Centers handled several of the smaller grinding jobs.

WITH THE NO. 2 MOORE JIG GRINDER, all die sections were screwed and doweled into place, put on the machine and ground in one set-up. This eliminated separate section hole-grinding and the accompanying difficulty of accurately locating each section in the die bed. The Jig Grinder does the job in one-third the time required by previous methods.

To grind Stations 2, 3, 4, 5 and 6, the new contour-grinding and slot-grinding features of the Jig Grinder were utilized.

Die try-out and assembly operations were performed the modern, fast, "mechanized" way on the Moore Die Flipper.

End results? Moore equipment brings true interchangeability to the toolroom, lowers tool costs, increases toolroom capacity, prolongs die life and achieves greater accuracy.

Detailed bulletins on these machines are yours for the asking—today. Write to: Moore Special Tool Company, Inc., 728 Union Avenue, Bridgeport 7, Conn.



No. 2 MOORE
JIG GRINDER

ADD TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS
DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

NEW... for



**HIGH SPEED
ATTACHMENT
for rotary filing and
cutting with
HIGH SPEED STEEL
AND CARBIDE TOOLS**

TRIPLES RATED SPINDLE SPEED of any flexible shaft machine by step-up gears in the gear head. Easily meets surface-feet-per-minute (sfpm) recommendations, even for carbide tools . . . gives spindle speeds up to 27000 rpm when fitted to the Strandflex 4-Speed Gear Drive Unit shown here.

EASY TO USE. The step-up gears are built into the gear head, rather than the handpiece, permitting the use of a smaller shaft of maximum flexibility. In addition, the handpiece is lightweight, easy to control . . . reduces operator fatigue and permits faster, more accurate work.

See your
Strand Distributor
or write direct
for information

Strand
FLEXIBLE SHAFTS

**FLEXIBLE
SHAFT MACHINES**
"the Finest in the Field"

Strand FLEXIBLE SHAFT MACHINES!

QUICK CHANGE HANDPIECE

**change tools in seconds
...easy as 1-2-3**

As easy as that! No wrenches required. No wasted motion. You can put mechanics' time to work, not to changing tools!

The new Quick Change Handpiece is standard on new Strand Flexible Shaft Machines with #6 or smaller handpieces as well as the new High Speed Attachment —at no increase in price! It can be easily adapted to your present units merely by fitting them with a new casing and adapter parts. Casing and adapter parts quickly pay for themselves in faster production.

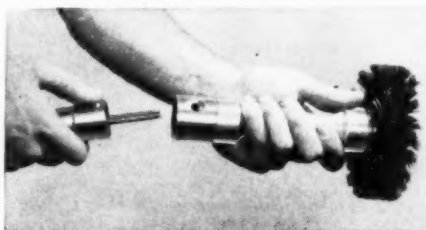
Get the full story now. Call your Strand distributor or write direct for information and name of nearest distributor.

NEW ROTARY TOOL CATALOG

illustrates and describes all Strand Rotary Files and Cutters for use with Strand High Speed Attachment and Quick Change Handpiece. Write for your copy today. Also ask for Catalog 231-A listing full Strand line of Flexible Shaft Machines.



1 PRESS the locking button mounted at the shaft end of the handpiece ...



2 PULL the handpiece away from the flexible shaft in one easy motion ...



3 SNAP another handpiece in position ...
YOU'RE READY FOR WORK!



FRANKLIN BALMAR CORPORATION

manufactured
and marketed
by

H. A. STRAND DIVISION
Woodberry, Baltimore 11, Maryland
3001 N. Wolcott Ave., Chicago 40, Illinois

PLAN FOR TOMORROW . . . by making the *Bridgeport* TURRET MILLING MACHINE a "MUST" for TODAY

Many shops have modernized their production methods by replacing obsolete equipment with BRIDGEPORT MILLERS . . . the machines that mill, drill, bore and shape at all angles with one set-up.

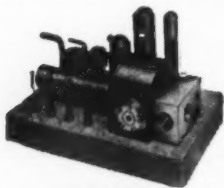
These shops planned for the future when they installed "BRIDGEPORTS" in their tool rooms, die shops and production lines. They were convinced by the experience of others that their moderate investment in modernization would be returned quickly through economies they could effect, and that obsolescence would be deferred for many years to come.

A most plausible reason for the long time economy of the "BRIDGEPORT" is not merely its faster, more convenient and closer accuracy in handling a wide range of work but because improved methods over those offered by Bridgeport Turret Milling Machines have yet to be developed for practical application.

Ask your dealer . . . or us . . . to show you how you can make the "BRIDGEPORT" pay you handsome returns.

MILLING MACHINE VISE

This improved vise provides great gripping power, is streamlined for appearance and equipped with coolant trough. Rigid holding is assured by large diameter screw. Two sizes: 5"x3½" and 6"x5" jaw openings.



NO. 2 BORING HEAD

Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridgeport 1 hp Milling, Drilling and Boring Attachment.

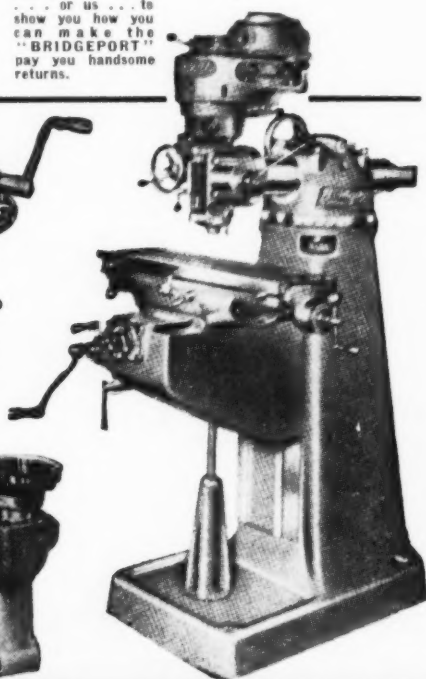


RIGHT ANGLE ATTACHMENTS

(Left) HEAVY DUTY. For milling and drilling at right angles. Fits both Master and 1 hp Bridgeport Heads.



(Right) LIGHT DUTY. For right angle milling and drilling narrow, deep molds and cavities.



Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

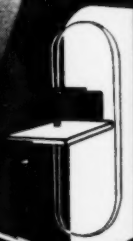
LENOX

BAND SAW BLADES

for every metal cutting problem
Regular Metal Cutting • Skip-A-Tooth • Friction Cutting



- For use on Wells, Kalamazoo, Johnson, Famco and all other make Band Saw machines.
- Try our Wavy Set for cutting angle iron, tubing and thin materials.



SAFETY BOX — 100' COIL STOCK

- For use on Do-All, Grab, Tannewitz and other Band machines.
- Stock ready to draw out.
- Dangerous loose ends can be withdrawn into box.

THE TOOLS IN THE PLAID BOX

AMERICAN SAW & MFG. COMPANY
SPRINGFIELD, MASS.

HACK SAWS • BAND SAWS • GROUND FLAT STOCK • HOLE SAWS

**BIG JOBS...
SMALL JOBS...**



HOLD with ***Magna-Lock*** electro-magnetic **CHUCKS**

Get maximum flexibility . . . use Magna-Lock Chucks singly or in multiples, according to size of job. Work in dimensions up to machine tool's capacity. 22% more holding area, moisture proof, other exclusive advantages. 3 types, many sizes.



**Get details...
WRITE
Dept. MT-113**

Magna-Lock

Hanchett **MAGNA-LOCK CORPORATION**
Magnetic Chucks and Devices
BIG RAPIDS MICHIGAN, U. S. A.

High Speed "Controlled Tapping"

Saves Taps . . . Stops Spoilage . . .

"Controlled Tapping" is the nearest to automatic tapping perfection yet developed! AND users of Procnunier Tapping Heads have been enjoying this advantage for many years. "Controlled Tapping" action is made possible by a unique, exclusive clutch design. It's the heart of the tapper—and operates with a smooth, sensitive "cushioned action." The tap driving power is automatically regulated by the pressure applied through the drill press spindle. Large or dull taps require more pressure and driving power than smaller, sharper ones—and "green" as well as experienced operators can quickly detect dull or loaded taps by the "feel" or pressure applied. The acute sensitivity of the clutch results in less tap breakage, fewer spoiled pieces and makes it easier to maintain high production schedules and output.

Important too, the clutch is kept dry—no excess oil reaches the friction surfaces to impair sensitive reaction to tapping pressure which is so necessary for precision tapping at high speeds.

This is only one of the many exclusive features and advantages that have made Procnunier Tapping Heads the favorites in the industry. Learn how you too, can produce more, for less—faster and longer with Procnunier.

Write for **FREE Brochure**
Giving full particulars on the
complete line of Procnunier
Tapping Equipment.



Procnunier

Safety Chuck Company
14 S. CLINTON ST. CHICAGO 6, ILL.

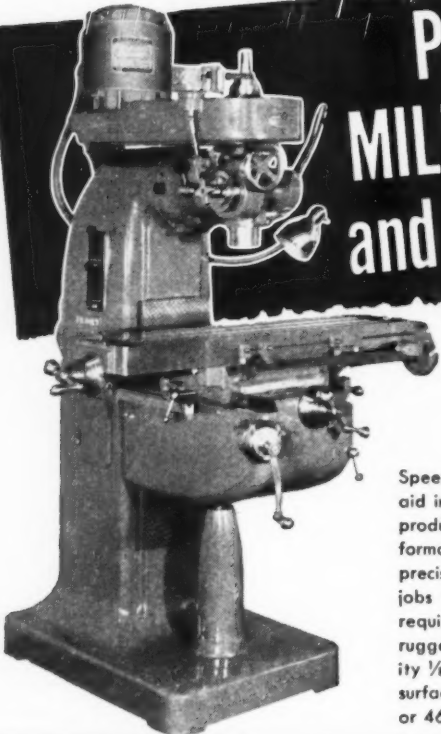


New
TRU-GRIP
Tap
Holder

The exclusive Procnunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

PROCUNIER SAFETY CHUCK CO.
14 S. Clinton St., Chicago 6, Ill. Dept. 11
Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procnunier High Speed Tapping Heads.
Name _____
Address _____
City _____ Zone _____ State _____

For **PRECISION** at Surprisingly **LOW COST**



**Put All Your
MILLING, BORING
and DRILLING Jobs**

**on INDEX
MILLS**

Speed up operations with INDEX MACHINES as an aid in meeting today's high pressure tool room and production plant service. They assure you peak performance while holding to the Index reputation of precision and economy . . . For those heavy-duty jobs where increased speed and feed range are required, you will find your answer in this strong, rugged MODEL 55 VERTICAL MILL (Pictured). Capacity $\frac{1}{8}$ " to $1\frac{1}{2}$ " end mills in steel and a table working surface of 32" x 9" or 38" x 9", Overall 40" x 9" or 46" x 9".

MODEL 40 VERTICAL MILL

A machine that emphasizes the combination of Precision, Production, and Economy . . . It embodies many features that provide for faster, more economical milling, resulting in a substantial cut in production costs . . . It is sufficiently rugged for day-to-day operation and can also be used for accurate boring and locating . . . Capacity $\frac{1}{8}$ " to 1" end mills in tool steel. Table working surface 8" x 26", 8" x 34" overall.

MODEL 60 HORIZONTAL MILL

A versatile machine with simplicity of design that permits an unusually low price while reflecting quality, accuracy and practical utility . . . A product where advanced engineering and expert craftsmanship have joined to bring out an outstanding piece of equipment adapted to tool room use, yet sufficiently rigid for the requirements of production shops . . . Standard table 40" x 9" with larger table optional. Equals or exceeds a light No. 2 in capacity.

INDEX BUILDS BETTER MILLS . . . WRITE FOR LITERATURE

INDEX Machine Co.

540 N. MECHANIC STREET

JACKSON, MICHIGAN

It doesn't take a heavyweight to do a man-sized job



Before these shears were shifted to air operation the entire weight of a man was required on the foot treadle to cut the sheet metal.

All this is changed now. A light touch of the girl's foot on the pedal puts all the power of the Schrader Air Cylinder to work, sending the knife-edge through the sheet metal.

This is just one example of how air cylinders can speed up production and reduce fatigue . . . one of many hundred applications of Schrader Air Cylinders and Valves.

To find out how Schrader air control products can be put to work for you . . . to boost production — lessen operator fatigue — increase safety . . . send us a letter outlining your particular installation, your idea, or fill out the coupon below.

Schrader

REG. U. S. PAT. OFF.

products

control the air

Mail This Coupon Today

Air Cylinders • Operating Valves • Press & Shear Controls • Air Ejection Sets • Blow Guns • Air Line Couplers • Air Hose & Fittings • Hose Reels • Pressure Regulators & Oilers • Air Strainers • Hydraulic Gauges • Uniflare Tube Fittings

A. SCHRADER'S SON

Division of Scovill Manufacturing Company, Incorporated
466 Vanderbilt Avenue, Dept. O-7, Brooklyn 38, N. Y.

I am interested in more information on.....

Name.....Title.....

Company.....

Address.....



Kalamazoo

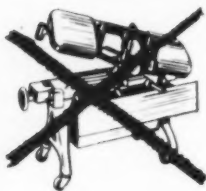
MODEL 8 C

CUTS 8-INCH
ROUND,
16-INCH FLAT,
8-INCH PIPE

METAL CUTTING BAND SAW

Coilant equipment shown is available at extra cost.

AN ALL-NEW DESIGN . . . FIRST TO MEET TODAY'S METAL CUTTING NEEDS!



Model 8C's smooth, clean-cut design eliminates the multitude of clothes-catching, dirt-catching and knuckle-barking projections common to conventional metal cutting band saws.

You'll get performance never before available when you get the ALL-NEW Model 8C band saw. Designed to meet your metal cutting needs today—and for a *long time* to come—Model 8C embodies years of *Kalamazoo* experience in the field and the best industrial design talent.

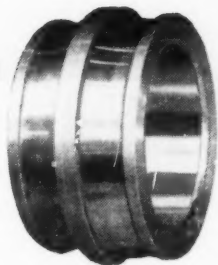
Once you've *seen* the new 8C, you'll agree it has everything you've been looking for in an 8-inch metal cutting band saw. Ask your dealer for a demonstration *soon*—or write today for descriptive literature and name of your nearest dealer.

MACHINE TOOL DIVISION

***Kalamazoo* TANK and SILO COMPANY**

1132 HARRISON ST., KALAMAZOO, MICHIGAN

SKF



RACES

Against Time...

with the

GISHOLT NO. 24 HYDRAULIC AUTOMATIC LATHE

When it comes to fast production of top quality spherical roller bearing races, SKF doesn't fool.

These big Gisholt No. 24 Hydraulics remove 34 lbs. of metal in two operations in a total of only 2.80 minutes' machining time on each of two machines. All cutting is on 52100 bearing steel and done at speeds of 325 to 350 f.p.m.

Speed is important, of course. But precision is the governing factor. How the Gisholt No. 24 does the job is a story that might mean real savings for you, too.

The No. 24 Hydraulic Automatic Lathe is a larger version of the famous No. 12 that has an outstanding success record on hundreds of jobs. If you have large volume precision work up to 24" diameter, the Gisholt No. 24 is the machine to investigate. Write for full information.

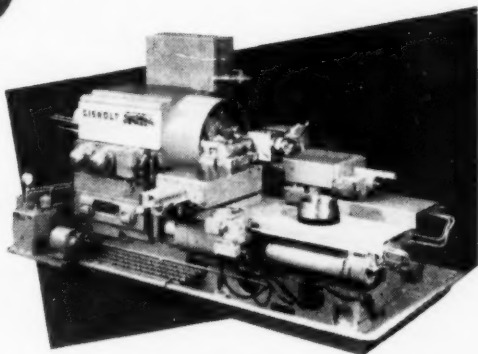
GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

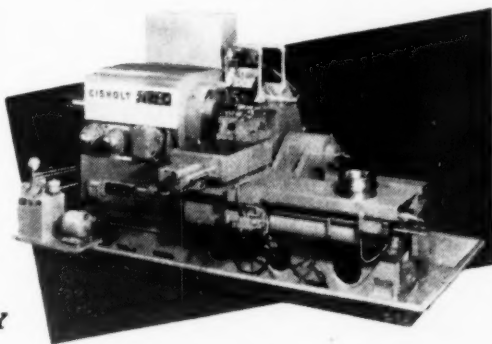
THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



First Operation: Chucked on OD with 3-jaw hydraulic chuck, part is turned up to the jaws, faced, chamfered, bored and bore radius formed. Cam relief on rear tool block turns boring bit clear of workpiece as it is withdrawn.



Second Operation: Part held on expanding arbor by hydraulic pressure is finish turned, faced, chamfered and bore radius formed. Special rocker arm type carriage at rear tips in shaving tools to form both roller grooves with feed of .003" to .0045."



What You Should Know about the



—and how it can cut tap costs up to 75%!

Leading metalworkers find the B.P.S.* System reduces their tap costs by 50 to 75% — and more! And the same profitable plan is available to you!

B.P.S.* SYSTEM ALWAYS WORKS!

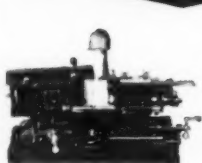
These two simple processes *cannot* fail: (1) Sharpening flutes and chamfers of taps to an exceptionally high degree of accuracy (possible only on Blake grinders) and (2) Sharpening your taps at *regular, planned intervals*.

HOW THE B.P.S.* SYSTEM REDUCES YOUR COSTS

This superior sharpening method gives your taps many times longer life. By using the Blake Chamfer Grinder and Blake Flute Grinder your operators can sharpen each tap precisely to correct any error in indexing and control the rake angle. Precision-sharpened taps cut much more accurately, more uniformly, with less strain — hence serve you more efficiently, far longer!

**Blake Precision Sharpening*

HERE'S WHAT THE B.P.S.* SYSTEM CAN DO FOR YOU!



**BLAKE CHAMFER
GRINDER**



**BLAKE FLUTE
GRINDER**

- Gives much more production per tap!
- Greatly reduces tap costs!
- Provides greater tap accuracy and uniformity!
- Greatly reduces tap breakage and spoiled or unacceptable work!

INVESTIGATE THE B.P.S.* SYSTEM NOW!

Write us for reprints of *American Machinist* and *Machinery* articles on this subject. Descriptive folders on both Blake grinders also available.



EDWARD BLAKE COMPANY

440 CHERRY STREET • WEST NEWTON 65, MASS.



Black Diamond Precision Drill Grinders • Waltham Cutter Sharpeners • Surface Finish Standards



DOUBLE CIRCLE TOOLS

HAVE BOTH

**endurance
AND
accuracy**

It takes both to produce quality tools . . . for each is dependent upon the other to give trouble free performance.

CHICAGO-LATROBE makes sure that the complete line of Double Circle Tools has both *endurance* and *accuracy*. It is a result of high quality CHICAGO-LATROBE standards . . . with each manufacturing step carefully checked . . . and the finished product scientifically inspected by experienced craftsmen to insure *precision* tools.

To back up CHICAGO-LATROBE'S determination of maintaining its enviable reputation for leading quality, every fifth employee is a qualified inspector. No finished tool can escape these skilled inspectors without having the qualities of both *endurance* and *accuracy*.

To insure low yearly tool costs it will pay you to specify **DOUBLE CIRCLE TOOLS**.

ORDER FROM
YOUR INDUSTRIAL
DISTRIBUTOR



CHICAGO-LATROBE

411 W. ONTARIO ST. CHICAGO 16

DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES • CARBIDE TOOLS • SPECIAL TOOLS

SAMPLE
thread on Clamp Screw

Rolled thread $6\frac{1}{4}$ " long
 $\frac{3}{4}$ " - 10 pitch steel

Class 3-1045 steel

Time - 9.5 seconds at 90 S.F.

Finish - 20 Micro increased

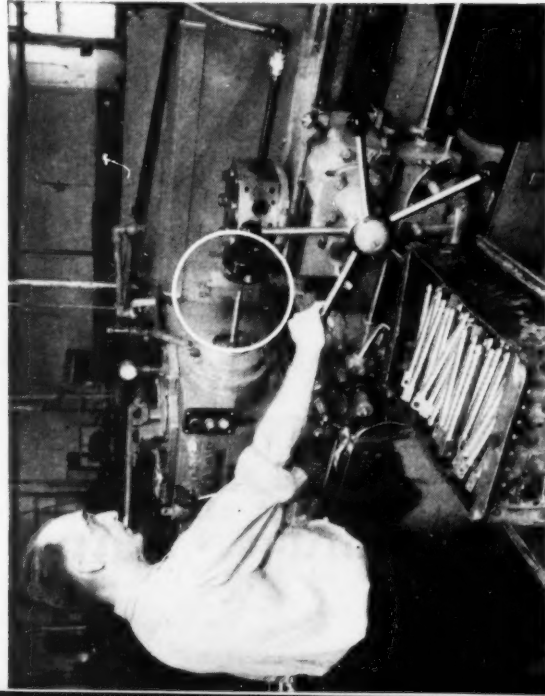
Note: Rolling increased 5 points

Rockwell B hardness



WHY THIS NEW SELF-OPENING HEAD

Rolls threads more accurately • stronger • smoother...and cheaper than any other tool



$\frac{3}{4}$ " Self-Opening head rolling piece shown on a hand operated turret lathe.

This "Fette" patent chipless thread forming method is *different*—material rolled flows in an axial direction so that the thread is generated ahead of the rolls. Flow to full depth of thread avoids broken grain structure and cratering crest; surfaces are densified, smoother, more wear resistant. Part shown is unretouched.

It works like this—annular grooved rolls are positioned in plates in the head and only the rolls are changed for different thread forms or pitches. Fine adjustment is provided for exacting diameters. Rolling speeds are equivalent to turning speeds.

Self-opening heads, with simple quick-acting gear mechanism, frees the work instantly at proper thread length; no lead screw or follow up cam required.

These National Acme (Fette patent) Heads accommodate all standard parallel thread forms and are made in both revolving and non-revolving types suited to horizontal and vertical machines.

Bulletin FRH-53 gives full data

Manufactured and Sold in U. S. A. only by

The NATIONAL ACME COMPANY

170 East 131st Street • Cleveland 8, Ohio, U.S.A.

RUSNOK MILL HEADS

1/4 H. P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.
High speed medium-light operation.
For bench, floor and pedestal mills.
Fits milling machines with overarm 1 1/2" to 3",
3/8" end mill capacity.

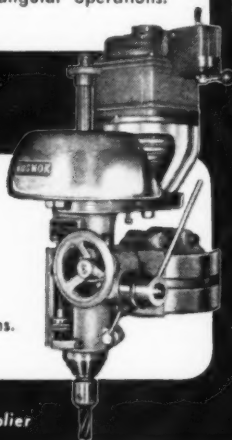


1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

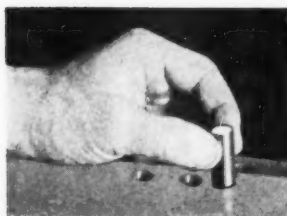
1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

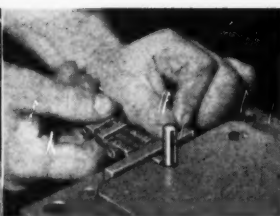


WRITE for complete details and give name of your supplier

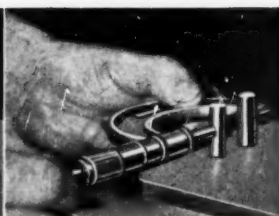
RUSNOK RUSNOK TOOL WORKS, 4840 W. North Ave., Chicago 39, Ill.
MILLING • DRILLING • BORING



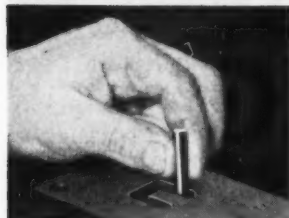
Check hole sizes



and locations,



find centers,



gage slots,

**and dozens of
other uses with
HORBERG**

precision taper



Pin Gages

SAVE TIME AND MATERIALS

Oil-hardened tool steel tapered pin gages accurate to $+0.0001'' - 0.0000''$ insure dependable sizing and location of holes and slots for machinists, set-up men, tool and die men, inspectors, all who need precise hole measurement.

CONCENTRIC TAPER on lower half of each gage fits holes $0.0012''$ smaller

than standard letter, fraction, and number size drill holes. Makes insertion easier. Permits gaging of odd-size holes and slots.

ALL GAGES are $1\frac{1}{2}$ inches long. Sets contain a pair of each size in a plastic case with 4-place decimal equivalents of each size plainly marked.

ALL ITEMS STOCKED FOR IMMEDIATE DELIVERY

THE *Horberg* GAGE COMPANY

Quantity **21 STAPLES ST., BRIDGEPORT, CONN.**

..... Letter sets @ \$50.
52 gages (A-Z)

..... Fraction Sets @ \$56.
60 gages ($\frac{3}{64}''$ to $\frac{1}{2}''$
in $\frac{1}{64}''$ steps)

..... Number Sets @ \$104.
120 gages (1 to 60)

..... Single gages @ \$ 1.

..... Stand alone @ \$10.

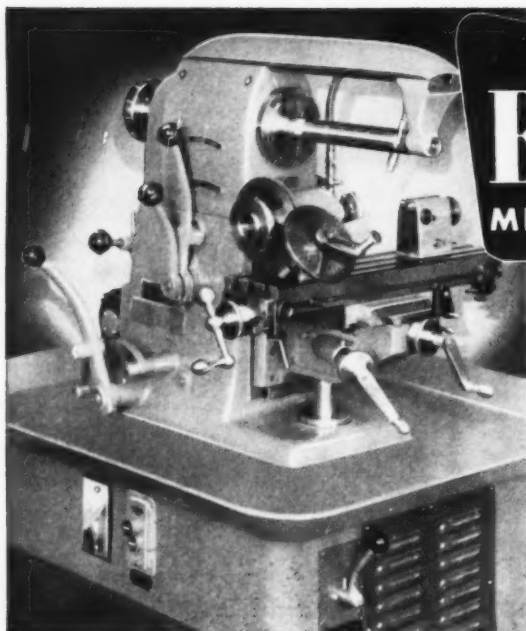
Please Rush checked items and literature to

company

address

name

title



ELGIN

MILLING MACHINES

TOOL ROOM PRECISION WITH PRODUCTION SPEED

... that's what you expect and get from Elgin Machine Tools. They are designed and built to tool room standards, to perform to close tool room tolerances... and with sturdiness permitting speed that fits right into production lines.

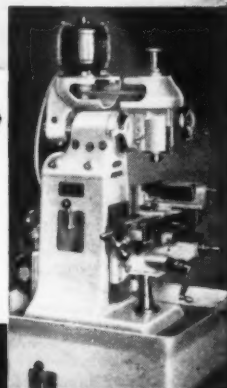
HORIZONTAL MILLING MACHINE

Spindle of nickel steel, hardened and ground externally and internally, and fitted with pre-loaded ball bearings. Speeds, 85 to 2750 R. P. M. with Variable Speed Drive, directly reversible. Table, $4\frac{1}{4}$ " x 18" with longitudinal travel 12"; transverse, 6", vertical, 6". Two-speed motor, $\frac{3}{4}$ - $\frac{3}{8}$ H. P.

Elgin Lathes and Milling Machines are standard equipment in many tool rooms and shops where extreme accuracy is necessary.

VERTICAL MILLING MACHINE

Spindle is nickel steel, hardened and ground both externally and internally, and fitted with pre-loaded ball bearings. Five speeds, 200, 700, 1250, 2250 and 4000 R. P. M. Vertical travel of spindle, $1\frac{1}{4}$ ". Table is $4\frac{1}{8}$ " x 18" with 12" longitudinal travel; transverse travel 6". Vertical table travel 7". Head swivels 90° each side of center.



ELGIN TOOL WORKS, INC.

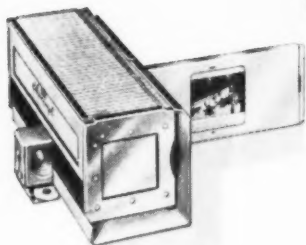
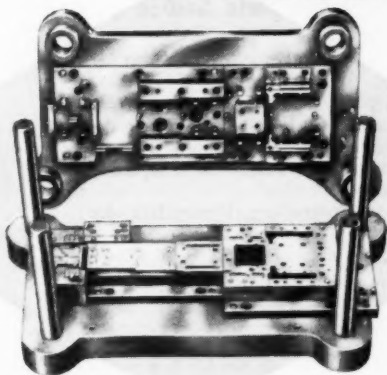
1772 BERTEAU AVENUE

CHICAGO 13, ILLINOIS

200 frames a minute. 

on PRODUCTO

DIE SET



PERFORMANCE

12,000 pieces produced per hour
Over 2 million pieces produced between grinds
Continuous operation for 20 months

EQUIPMENT

Die: six-station (piercing, forming, cut-off)
Die Set: Producto special four-pin
Feed: special high-speed automatic

SPECIFICATIONS

Frame Size: 2.157 inches by 2.020 inches
Tolerances: plus .000 inch minus .005 inch
Material: .010 inch thick 52 S-H38 aluminum

Need Prompt Service? Call Your Nearest Producto Branch:

Bridgeport 1	970 Housatonic Avenue
New York 12	197 Lafayette Street
Providence 3	Durant Tool Supply Co.
Camden 2	Fidelity Tool Supply
Detroit 11	3017 Medbury Avenue
Cleveland 14	3200 Lakeside Avenue
Dayton 7	3632 Delphos Avenue
Chicago 44	Federal Machinery Sales Co.
Los Angeles 21	Jamison Steel Corp.
San Francisco 7	Jamison Steel Corp.

It is no secret that the ease of operation of the slide changer, illustrated above, is due to the precise stamping of the frames. To obtain consistently accurate frames, the Airequip Mfg. Co., New Rochelle, N. Y., selected a Producto die set to mount their die. Result — practically no rejects, and an amazing production rate of 200 frames per minute!

Call your nearest Producto branch . . . they have the answer to greater stamping accuracy and higher production.

THE PRODUCTO MACHINE COMPANY
960 Housatonic Ave., Bridgeport 1, Conn.

FOR PRECISION DIE SETS... FAST... CALL...

ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY.



4PD52

Cooley ELECTRIC HEAT TREATING FURNACES

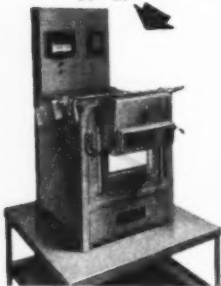
31 MODELS—A Complete Source of Small Heat Treating Furnaces

Cooley Heat Treating Furnaces are used for heat treating operations from 300° F. to 2500° F.

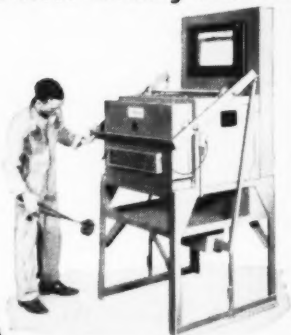
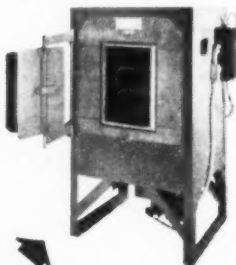
A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

Indicating controlling Pyrometers are available with all Cooley Furnaces.

Bench Type — For tools and small parts — to 2000°F 14 models and sizes to 10" w x 8" h x 18" d.

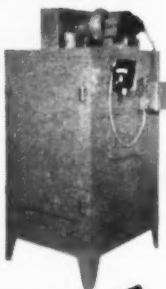


Industrial Box Furnace — General heat treating — to 2000°F 4 models and sizes to 15" w x 12" h x 30" d.



Recirculating Air Draw — Box type for controlled heating to 1250°F — steel tempering, glass annealing, etc. 5 models — sizes to 24" w x 15" h x 48" d.

High Temperature Box Furnace — For high speed steel treating to 2500°F — 3 models and sizes to 12" w x 8" h x 24" d.



Recirculating Ovens — for drying, finishing and industrial processing to 600°F—5 models and sizes to 36" w x 36" d x 60" h.

Write for Catalog and Complete Details

Cooley

ELECTRIC MFG. CORP.
36 SOUTH SHELBY STREET
INDIANAPOLIS 7, INDIANA

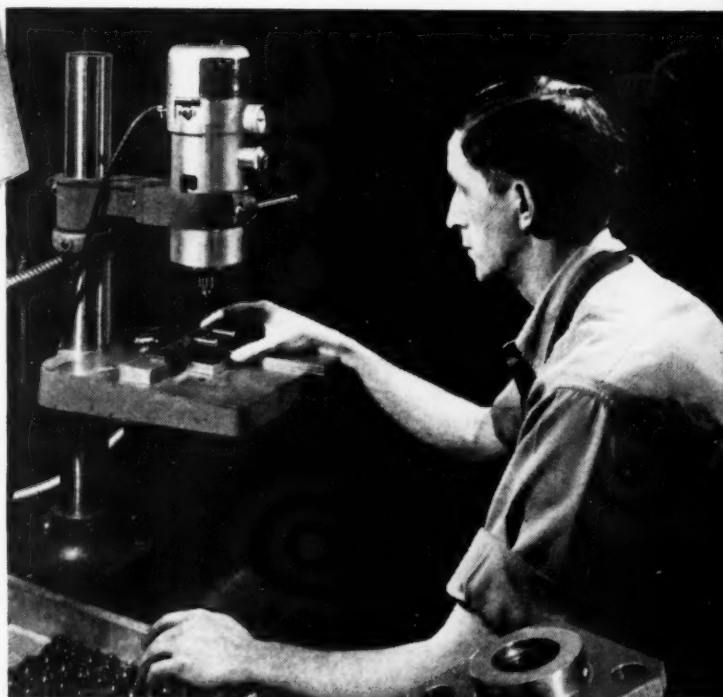
NOW, DUMORE DRILL HEAD makes every drill operator an expert!



THE new Dumore Automatic Drill Head does away with operator guesswork — the new *resistance drilling* way. High drill breakage losses are virtually eliminated by this remarkable new tool. It produces premium quality, small diameter deep holes, even with unskilled labor. And shop foremen report average drill life increases as much as 93 per cent.

Dumore's new *resistance drilling* automatically equalizes the *exact* pressure required for every stroke of the drill head...automatically compensates for variations in drill quality and workpiece hardness...factors your drill operators can't compensate for by sense of touch alone.

Get all of the advantages of this remarkable shop tool. Ask your nearby industrial distributor for a demonstration, or write the Dumore Company.



Holes for airplane parts are produced 12 times faster at a 97% cost reduction with this setup. In fact, the Dumore Drill Head paid for itself after only 4½ hours operation.

DUMORE PRECISION TOOLS

The Dumore Company
1335 Seventeenth Street, Racine, Wis.

The best
"soft" hammer
your money
can buy!



JAW-HEAD

Tough, resilient water buffalo faces deliver needed power, cushioned to protect fine finishes and delicate parts. Faces quickly and easily replaced. Safety-Flare handle gives comfortable, non-slip grip. When you need a "soft" hammer, make sure it's a C/R RAWHIDE Jaw-Head.

For further information write Dept. 22



FACES REPLACED IN SECONDS

Merely loosening a nut releases jaws for replacing faces. Tightening nut holds faces in vise-like grip.

CHICAGO Rawhide **MFG. CO.**

1301 Elston Ave.,

Chicago 22, Ill.

In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

● Available from leading industrial suppliers. Also C/R Rawhide mallets and Rawhide mauls.

WALSH

Rugged Walsh presses made in 1907 are still operating at a profit.

For press recommendations without obligation
send sample or blueprint to Engineering Department,
Walsh Press & Die Co., Division of American
Gage & Machine Co., 4709 W. Kinzie St., Chicago 44.
Esterbrook 8-6700.

BUDED AS THE ROCKIES

38

38-TON PRESS

WALSH PRESSES STILL IN USE MADE IN 1907

All presses lubricated and run-in with
Molykote at the factory.

WALSH PRESS & DIE COMPANY

*BIGJOE

Let

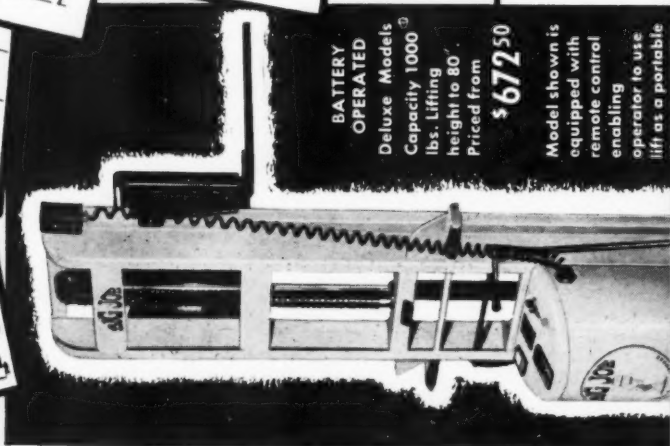
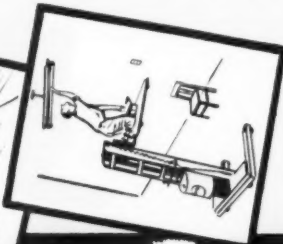
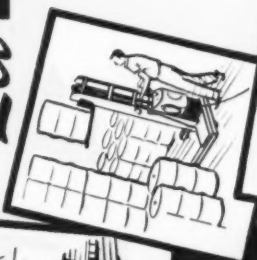
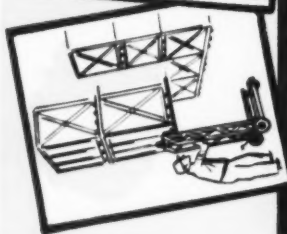
do it!

If it's loads up to 1000 lbs. that must be stacked or moved, Big Joe can do it cheaper. Bulky supplies, tote boxes, crated merchandise, heavy tools—all are tasks Big Joe can handle quickly and safely.

Big Joe Hydraulic Lifts are designed for one-man use on jobs too big to manhandle yet too small for lift trucks costing many times more. That's why they are ideal for the loading platform, shop, stockroom or warehouse—for things hard to hold or lift by hand.

Big Joe Lifts are of all welded steel. Every moving part is mounted on precision ball or roller bearings. Powerful, hydraulic lift mechanism works smoothly—is accurately controlled. And all models have positive locking safety brakes . . . Every Big Joe is fully guaranteed.

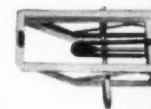
You can find out if Big Joe's "YOUR MAN" by simply asking for illustrated literature and specifications or—if you prefer a DEMONSTRATION ON YOUR PREMISES, simply state what you want Big Joe to do. Use handy form below.



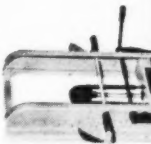
**BATTERY
OPERATED**
Deluxe Models
Capacity 1000[®]
lbs. Lifting
height to 80'
Priced from
\$672⁵⁰

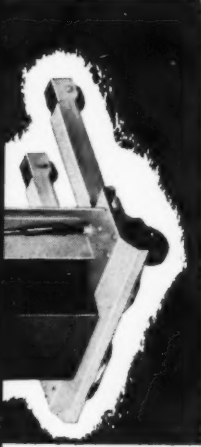
Model shown is
equipped with
remote control
enabling
operator to use
lift as a portable

Ask for
demonstration
on your
own premises.



Write or phone
and tell us what
you want
Big Joe to do.





OPTIONAL EQUIPMENT. Larger platform, (also removable platform extensions) and larger forks are available for all models. On deluxe battery models, variable speed hand lever or fast lifting push button switch, remote control and wide straddle base can be furnished.

PEDAL CONTROL
Standard Models

Capacity 750 lbs. Lifting heights to 58". "Step-on-it" Control.

Priced from **\$236.50**

BATTERY OPERATED
Standard Models

Capacity 1000 lbs. Lifting heights to 80". Finger-tip Control.

Priced from **\$587.50**

PEDAL CONTROL
Deluxe Models

Capacity 750 lbs. Lifting heights to 68". "Step-on-it" Control.

Priced from **\$281.50**

For Literature, Specifications or a Demonstration, fill in coupon and mail.

BIG JOE MANUFACTURING COMPANY 900-12 W. JACKSON BLVD., CHICAGO 7, ILLINOIS

(CHECK)

- ☐ Send complete specifications and literature
☐ A demonstration please. Arrange to show

Big Joe

(Describe operation or task to be done)

On or about

(date)

Most

Convenient

Time

Name of Company

Street Address

City

Zone No.

State

Signature

Title

BIG JOE
MANUFACTURING COMPANY
900-12 JACKSON BLVD. CHICAGO 7, ILL.

Let BIG JOE do it!

Distributors in Principal Cities
Cable Address: Big Joe
*Trademark Registered in
U.S. Patent Office



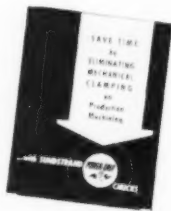
With Sundstrand Magnetic Chucks

Here's how Caterpillar Tractor Co. uses Sundstrand magnetic chucks to eliminate fixtures and cut down set-up time. A pair of chucks are used as a permanent set-up for milling the bell end flange on 26 different oil pans. Prior to installation of the Sundstrand chucks, their pans required 7 different fix-

tures and from ½ to 1½ hours set-up time. With magnetic chucks, a throw of a switch will secure or release either or both pans instantly. If you have milling or grinding operations in your plant it will pay you to investigate Sundstrand magnetic chucks.

**Free
Data**

Write for this new magnetic chuck bulletin — contains useful information on the complete line of Sundstrand Power-Grip Chucks. Ask for bulletin 438.



SUNDSTRAND

Magnetic Products Co.

Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

**Look to MODERN for accurate,
fast, economical thread cutting**



Hardened and ground throughout

Wider threading range

*Made with least
number of parts*

*Cut close-to-shoulder threads
without special chasers*

Easily adjusted for thread size

Greater flexibility

Quick and easy chaser change

MODERN STATIONARY TYPE SELF-OPENING **DIE HEADS**

**Modern Precision Tools
Include**

**STATIONARY SELF-OPENING
DIE HEADS**

**STATIONARY
COLLAPSIBLE TAPS**

**ROTARY
COLLAPSIBLE TAPS**

**MODERN-MAGIC
CHUCKS AND COLLETS**

**SELF-OPENING
STUD SETTERS**

**SOLID ADJUSTABLE
DIE HEADS**

**ADJUSTABLE HOLLOW
MILLING TOOLS**

**CHASER
GRINDING FIXTURES**

Modern Self-Opening Die Heads thread diameters from $\frac{1}{8}$ " to 7" in standard heads, and up to 14" in special heads . . . accurately, fast, and economically. They are adapted to practically every thread cutting operation within their capacity. Designed for use in hand screw machines, turret lathes, and other machines where the die heads are used in a stationary position.

**For complete information,
write for Bulletin No. M-124**

MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION

SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

one *American* broaching machine

SURFACE BROACH REMOVES 3/16"	INTERNAL BROACH REMOVES 1/32"	
 150 PIECES PER HOUR	 200 PIECES PER HOUR	

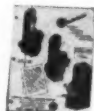
surface and internal broaching possible with *American* 3-way machine

To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations.

For more information on your particular broaching problem send a part-print or sample and hourly requirements. Address Dept. B.

For more information on American
Machines send for Catalog #300.



***American* BROACH & MACHINE CO.**
A DIVISION OF SUNSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

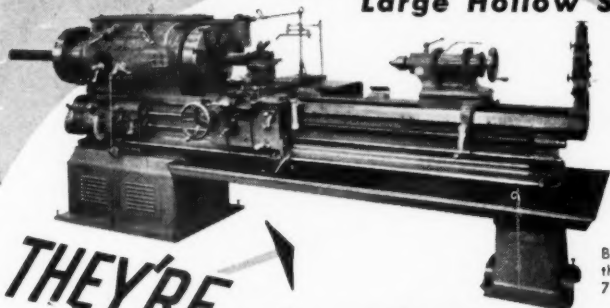
See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



**FOR FASTER PRODUCTION,
BETTER WORK, LOWER COSTS—**

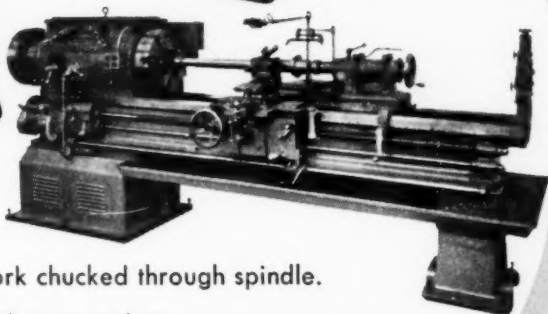
HYDRATROL LATHES

Large Hollow Spindle Type



Both Illustrations Show
the 18" Hollow Spindle
7 1/8" Hole

**THEY'RE
VERSATILE!**



- * Machine long work chucked through spindle.
- * Machine work between centers.
- * Also built with beds and carriages on each end of headstock for machining both ends of a shaft at one time.

SIZES 18" TO 36"

Small — 18" & 20" up to 7 1/8" Hole

Medium — 25" up to 12" Hole

Large — 32" & 36" up to 16 1/8" Hole

(Standard Type Lathes 16"-36")

IMPORTANT FEATURES

Timken Bearing Spindles.

Hydraulic clutches for forward and reverse, controlled from apron or headstock.

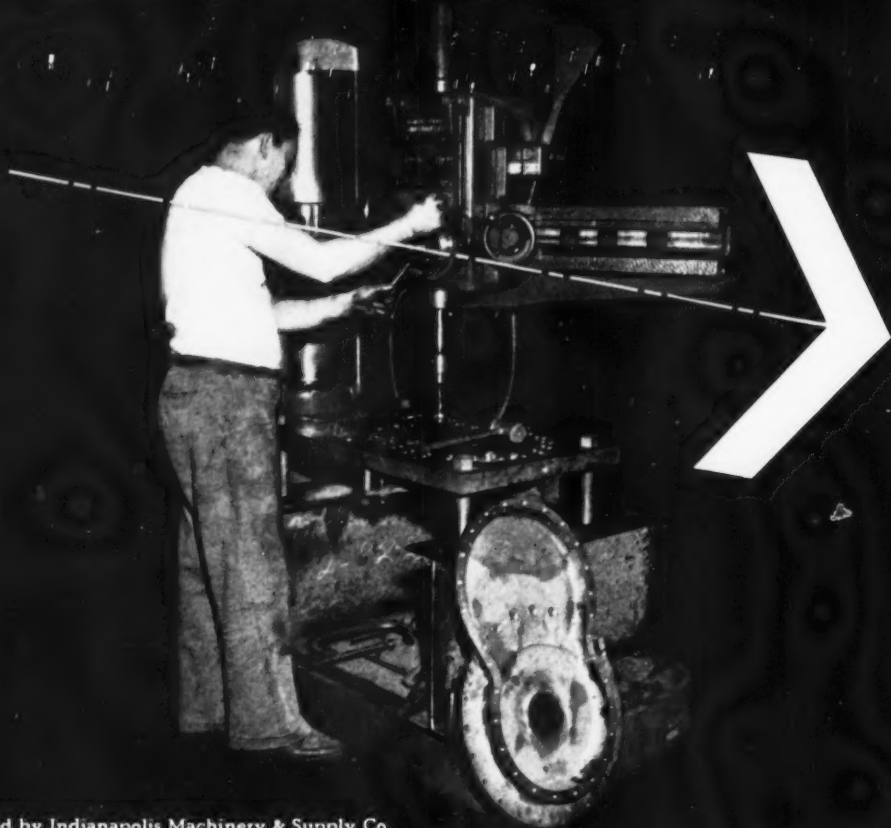
Hydraulic brake for close position control.

Hydraulic clutches self-compensating. No adjustment and full power capacity at all times.

LEHMANN
MACHINE COMPANY

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI
DIVISION OF NOVO ENGINE CO.

BALANCED PERFORMANCE



Installed by Indianapolis Machinery & Supply Co.

Drilling and tapping cast iron tank transmission parts at Dickey & Sons, Inc., Indianapolis, Indiana, one of the many job shops whose Cincinnati 3" Radials have "paid off" very quickly, as proven by careful record-keeping. This radial has a high "earning rate per square foot of floor space" because 1) it's inexpensive, and 2) a lot of work falls within its 1-inch capacity. Your Cincinnati representative will gladly arrange a demonstration.

best buys in their class!

CINTI DRILL

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U.S.A.

MORE WORK / DOLLAR

Cincinnati 3'7" radials are truly economy-priced light-duty machines whose 1" capacity handles a wide range of work.

Unit construction throughout

Anti-friction bearings throughout

All geared head

with automatic lubrication

9 spindle speeds

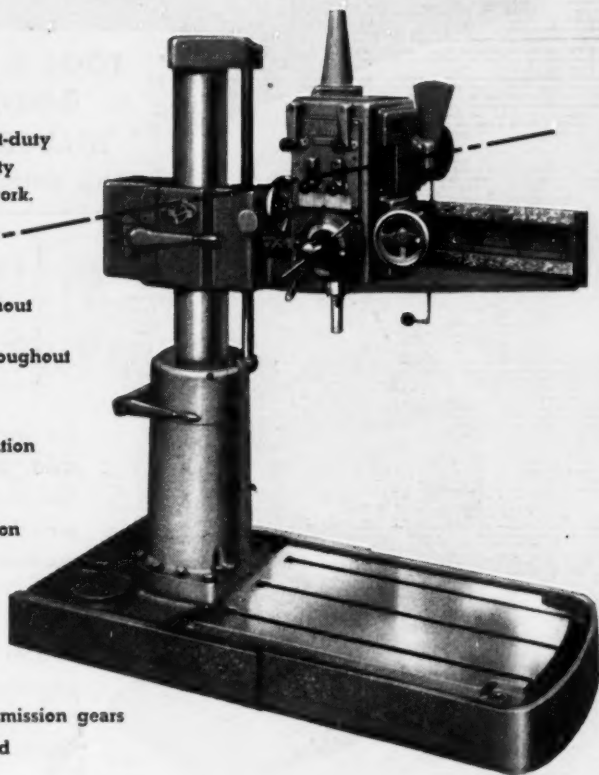
in geometric progression

30 to 1 overall ratio

6 power feeds

Simple direct drive

All speed and feed transmission gears
of alloy steel, hardened

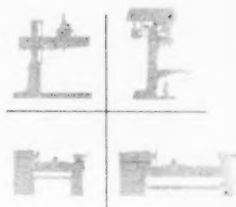


This cost-saving radial is just one of the complete balanced line of Cintidrills, including 21" sliding head box and round column floor drills; 14" 3000 and 16" 3000 sliding head bench and floor drills; 16" and 18" Royal Cintidrills, bench and floor models, single and multiple spindles. Write for catalogs and name of your nearest dealer.

best buys in their class!

CINTI DRILL

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U.S.A.



EXCEL No. 6 PAYS BOTH WAYS



**TOOL & CUTTER
GRINDING
HEADQUARTERS
in the smaller shop—**

**EXTRA SHARPENING
SERVICE
in the larger plant—**

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

*Builders
of Precision
Grinders
for 79
Years*

Swings work.....8" dia. x 16" long
Face mill capacity.....12" dia.
Table surface.....4" x 24"

**PROMPT DELIVERY
FOR DEFENSE**

COVEL
**PRECISION
GRINDERS**

BENTON HARBOR — MICHIGAN

DRILL
GRINDERS
CUTTER &
TOOL GRINDERS
HYDRAULIC & HAND
FEED SURFACE GRINDERS

*Write
for
BULLETIN
MT-113*



REGULAR TOOTH SAWS

SCREW SLOTTING SAWS

SIDE CHIP CLEARANCE SAWS

CENTER REAMERS

CARBIDE TIPPED
STAGGERED TOOTH SAWS

CIRCLE R METAL CUTTING TOOLS


Our specialty is circular metal cutting tools to increase or maintain efficiency in automatic production machines. We knew our business when we set up shop thirty years ago — and we've been refining our skills ever since.

Circle R tools are made in a wide range of most-used sizes — and special sizes or designs will be made up promptly on your order. Write for details, or look us up in the phone book and talk with our nearest representative.

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Chicago • Cleveland • Dayton • Detroit • Burbank • Milwaukee • New York City • Indianapolis
Pittsburgh • Philadelphia • Phoenix • Providence • Rochester • St. Louis • Greenville



METAL SLITTING SAWS
SCREW SLOTTING SAWS
COPPER SLITTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELER'S SLOTTING SAWS
TUBE CUT-OFF SAWS
SLITTING DISCS • SOLID &
TIPPED TUNGSTEN CARBIDE
SAWS • COMBINED DRILLS,
COUNTERSINKS & CENTER
REAMERS





***In stock* 400 sizes of 21 standard CLEVELAND PUNCHES!**

For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from $\frac{5}{32}$ " to $1\frac{1}{2}$ ". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from $\frac{1}{8}$ " to $1\frac{1}{16}$ " by using the same coupling nut and punch stem.

Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."

A-5169

THE CLEVELAND
PUNCH & SHEAR WORKS CO.
U.S.A.
Established 1880

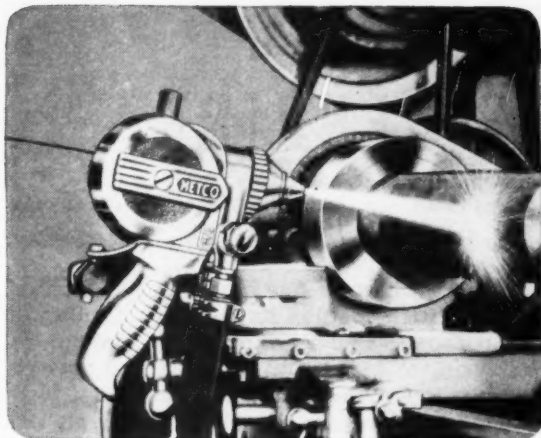
PUNCHING TOOLS & DIES

OFFICES AT
NEW YORK CHICAGO
DETROIT PHILADELPHIA
E. LANSING

POWER PRESSES

FABRICATING TOOLS

CLEVELAND 14, OHIO



**now
a really
low-cost
metallizing
installation...
with the new
Metco L-Gun**



Metallizing damaged journals on turbine shaft



Building up worn brake-drum



Metallizing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- ▶ Save up to 90% of replacement costs on machine repair jobs.
- ▶ Do your own hard-facing.
- ▶ Apply long wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires—With the new L-Gun you can spray: 10, 25, 80 carbon steels, stainless, babbitts, brass, bronze, nickel, aluminum, tin, zinc, special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals, build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.*

Same High Quality as Other Metco Guns—The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Mc. The following names are the property of Metallizing Engineering Co., Inc.

METCO • Sprabond wire • Metco-Weld

1 REG. U. S. PAT. OFF.

METALLIZING ENGINEERING CO., INC.

38-14 30th STREET

LONG ISLAND CITY 1, N. Y.

In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. Chelham near Woking, England

Don F. Watson
METALLIZING ENGINEERING CO., INC.
38-14 30th Street Long Island City, New York

- ☐ Please send me more information about metallizing.
- ☐ Please arrange a demonstration in my shop.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

CUT COSTS WITH MULTIPLE BENDING

Whether you're bending pipes, tubes, reinforcing bars or structural shapes, you can greatly increase your bending production by multiple die bending.

Shown here is our Model A-5 BENDING MACHINE tooled for bending 3 different radii without changing the set-up. In order to make multiple bending cost no more per die than single bending, individual dies are merely stacked on the die spindle and a shoe of the proper width permits the same degree to be bent without changing the automatic reset switch. The MODEL A-5 will bend pipe up to and including 2" standard weight pipe.



Redesigned and greatly improved, the Model A-5 still sells for only \$1975. F.O.B. factory, U.S. Funds.

Smaller and larger machines available.

Write for detailed and descriptive folder.

PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST.

DEPT. 3

PHILADELPHIA 40, PA., U.S.A.

Cuts wheel cost \$1500 per year



The job: Cleaning department of foundry was using 8" wheels with 4500 rpm grinders. When worn down to 5" or 7", wheels lost surface speed and metal removal dropped off. Wheels were laid aside or thrown away at this point.

Solution: Rotor Analyst suggested use of two Rotor 6000 rpm air grinders to use up discarded stub wheels.

Results: Investment of \$400 in new Rotor Grinders saves 1500 yearly in wheel costs.

How much will this idea save in *your* plant? Ask your Rotor Analyst for a trial grinder to find out!

ROTOR GRINDER FACTS

Rotor D125—6000 rpm—9¾ lbs.

Rotor D88—6000 rpm—9 lbs.

Others from 3100 to 20,000 rpm. Straight or spade handles. Ask for Catalog No. 38.

AIR

THE ROTOR TOOL CO

CLEVELAND OHIO

HIGH
CYCLE

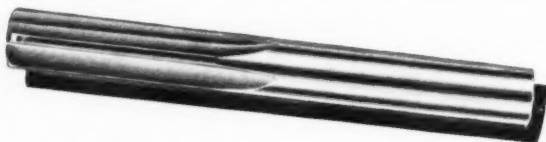
UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

AT
RAX

is for ATRAX ... the finest of cutting tools.



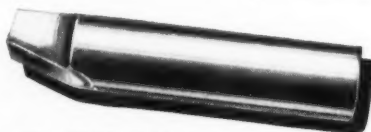
is for TOUGH ... they're solid tungsten carbide.



is for RIGHT ... they're precision ground-from-the-solid.



is for ACTION ... when Atrax tools solve difficulties in your production line.



is for X-TRAS ... Atrax tools give with longer service, less trouble, better profits.

Representatives and Distributors in principal cities in United States and Canada. Write for name of representative in your area.



Send for complete catalog NOW!

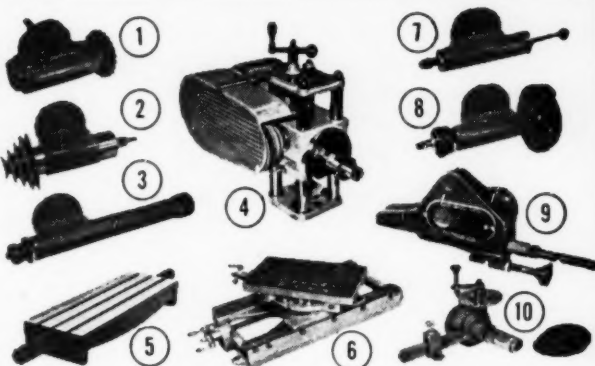
THE
ATRAX COMPANY

NEWINGTON 11
CONNECTICUT

master MACHINE TOOL ATTACHMENTS

for
**LATHES
TURRETS
MILLS**

OR USE INDEPENDENTLY



- | | |
|---------------------------------------|---------------------------------|
| 1. 90° Universal Milling Head | 6. Universal Feed Table |
| 2. Hi-Speed Milling and Drilling Head | 7. Internal Grinder Head |
| 3. Deep-Hole Internal Grinder Head | 8. External Grinder Head |
| 4. Basic Milling Unit | 9. Slotting and Keyseating Head |
| 5. Milling and Grinding Table | 10. Geared Dividing Head |



THREE SIZES

MODEL "C," 1/8 hp—9" to 13" LATHES

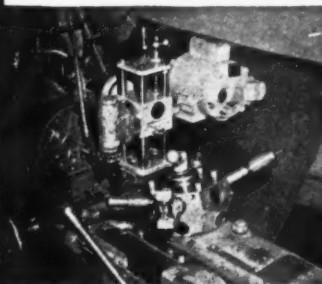
MODEL "B," 1/2 or 3/4 hp—13" to 18" LATHES

MODEL "M," 1 to 3 hp—18" to 72" LATHES

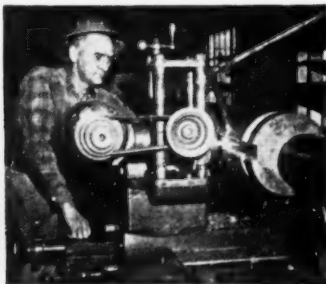
The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an **outstanding** value for maintenance, repair, tool room, and

experimental shops, as well as production, thus performs a full range of shop operations at a minimum investment. These improved models are outstanding in rigidity, capacity, and simplicity of set-up and operation and incorporate the latest features developed in our 17 years of manufacturing this tool. Investigate this valuable shop tool. For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries.

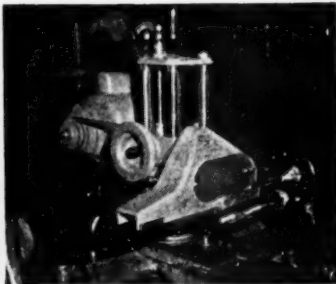
MAKES LOW-COST INDEPENDENT PRODUCTION SET-UPS — PORTABLE — SELF-POWERED



Milling on turret lathe completing part in one set-up



End Milling 2 1/2" keyway in 9 7/8" diameter shaft 22 ft. long



Master Slotting Head on lathe cutting internal taper keyway

FREE

WRITE FOR NEW ILLUSTRATED 24-PAGE CATALOG

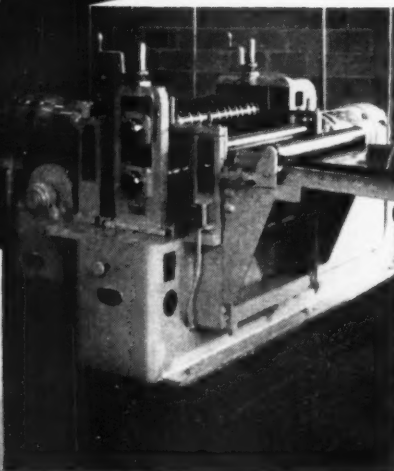
MASTER MANUFACTURING CO.

1301 EAST AVENUE A • HUTCHINSON, KANSAS, U.S.A.



YODER *Multiple Rotary* SLITTERS

- Easier Strip Supply
- Smaller Strip Inventories
- Lower Cost per Ton
- Simplified Production Planning
- Better Production Control



IF YOU USE over 100 tons of coiled strip per month, in strands of different widths, you will find a Yoder slitter a most profitable production tool. In times when materials are scarce, it eases your strip supply because you can buy standard widths from a greater number of sources of supply, and at a substantial saving in cost per ton. This saving alone soon pays for your investment.

Deliveries of standard widths are much quicker, avoiding the necessity for ordering long in advance and carrying big in-

ventories of slit-to-width strands. Consider the convenience of being able to supply your own needs in slit strands, on a few hours' notice, from a relatively small stock of standard width coils. It simplifies production planning, removes a source of constant worry in times of scarcity.

Yoder makes a complete line of rotary slitters for sheets and coils, including coil boxes, uncoilers, recoilers, scrap choppers, coil handling cars, etc. Yoder slitter book is a treatise on the economics of doing your own slitting. Ask for it.

THE YODER CO. • 5509 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding



for any application
DETROIT
has a

STANDARD Specific TAP

**"Specific" TAPS
CUT YOUR TAPPING COSTS**

**SPECIFIC STANDARD TAPS
for SPECIFIC MATERIALS
at NO EXTRA COST!**

1. If you use taps in just one kind of material Then order 'DETROIT' Specific taps for that material.
2. If taps are used mostly for a specific material but also occasionally for other materials Then order 'DETROIT' Specific taps for that specific material. They do a good job on other materials, too.
3. If you use taps interchangeably for different materials Then order 'DETROIT' general-purpose taps.

Every 'DETROIT' Specific tap is clearly marked on the shank with the name of the specific material for which it is ideally suited. Ask for Catalog-Bulletin #ST-52.

DETROIT
TAP & TOOL CO.

8615 E. EIGHT MILE RD.

BASLINE MICHIGAN

The Gairing
STANDARD
MILLING
CUTTERS

E-CON-O-MILL



**YOU'LL
SAVE**

ON INVENTORY • Same size blades, for cutting steel, cast iron or non-ferrous, fit cutter bodies of all sizes in all series.

ON GRINDING • Blades are supplied sharpened, ready for use, may be re-sharpened in or out of the body, to a gage.

WAITING for DELIVERY • All series 2500 cutters 5" to 16" dia. and all blades carried in stock for immediate delivery.

TOOLING by GAIRING

In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING TOOL COMPANY • 21228 Hoover Road • Detroit 32, Michigan

It takes only a **Jiffy** to pack it right... to ship it fast...



Whether you ship
spare parts, tools,
accessories, precision
instruments or other products
of semi-fragile or non-fragile
nature—you need only JIFFY
PADDED SHIPPING BAGS for complete packing protection.

Consider the savings effected in using JIFFY PADDED SHIPPING BAGS.

Time and Labor—the entire packing operation is reduced to 3 simple steps.

Insert item—Fold along scored line—Staple or Tape.
SAVE UP TO 76% IN PACKING TIME!

Packing Material Costs—stock JIFFY BAGS and eliminate the need for corrugated boxes, fillers, overwraps and twine. JIFFY's built-in expansion cushioning hugs contents tight, absorbs shocks in transit. Its patented construction prevents damage due to moisture, dirt or dust.

Available in 8 standard sizes.

Free samples on request.

Distributors in 43 principal cities.

Jiffy Bags meet Military Specification MIL-B-4604 (USAF).

JIFFY MANUFACTURING COMPANY

374 FLORENCE AVENUE ★ HILLSIDE, NEW JERSEY



The P. D. Q. (Portage Double Quick) tool holder and adapter line opens a new era in quick change tools. These Portage tools not only mean new speeds in production and set-up time, but increased accuracy as well.

Send for the New P. D. Q. Catalog



PORTAGE Double-Quick TOOL CO.

1037 Sweitzer Avenue • Akron 11, Ohio

Featured

IN THIS ISSUE

Feeding Short Strip Stock to be Formed, Extruded, and Embossed Through a Progressive Die	157
Which Grade of Carbide Should You Use?	162
Safety Plan For Pneumatic Chucks	177

Feeding Short Strip Stock to be Formed, Extruded, and Embossed Through a Progressive Die, by Paul Prikos. The problem of a piece part sliding smoothly through a die frequently presents many problems. Some of these problems and their solutions are analyzed by the author. Mr. Prikos, besides being vice president of Prikos & Becker Tool Co., is consultant tool and die editor of MACHINE and TOOL BLUE BOOK. He is also a member of BLUE BOOK's editorial board. Page157

Which Grade of Carbide Should You Use? by Guy Monacelli. Should you use a hard grade of carbide, a soft grade, or one that is ductile? These are questions which must be answered if most efficient service is to be obtained from carbons. At the end of the article is a table of various carbide manufacturers, their grades of carbides, and applications. Page162

Safety Plan for Pneumatic Chucks, by James Joseph. One of the dangers inherent in any application of compressed air to holding devices is the danger of a sudden cessation of air, thus causing the work to fly off the chuck, or holding device. This problem has been solved neatly by Hydro-Aire in California. They have developed a valve-diaphragm which ties into the plant's main air line. If air in the line falls to a dangerous level a warning whistle sounds. Page177

Automatic Welding Cuts Costs of Fan and Blower Elements. This is the story of how Buffalo Forge fabricates large blowers and fans by means of electric arc welding. They have found that welding permits a high degree of design flexibility to meet specific installations. Page185

Quick-Action Nest Type Drill Jig, by Tom Brown. One of the cheapest and most efficient methods of locating flat shapes in drilling jigs is by means of the nest. One of the nest type drill jigs is described by the author. It appears to have performed successfully and might contain an idea for other applications. Page194

Flame Plating Protects Parts From Wear. Flame Plating is a new method for applying hard, thin, precise coatings of powdered metals on metal parts. It is used to help solve friction and abrasive wear problems. Tungsten carbide coatings from .0005" to .020" are currently being applied. Page209

Which New Material Shall I Use? A Summary of Recent Developments, by Julius J. Harwood. This is the second, and concluding, part of this series on new materials. Among the materials discussed in this part are electronic, magnetic, electrical and ceramic materials and information on recent foundry practices. Page 217

Get Your Money's Worth Out of Those Meetings, by Edmund Mottershead. This continues the discussion begun in the October issue on conferences. While an article by itself, and not a part of a series, together they give valuable hits on successful handling of conferences. Page 235

Special Report on Grinding Machines, report number 35. This is a continuation of the grinding report. The feature article this month deals with Optical Grinding. Also included in the report is a discussion of late model grinding machines, and specifications of American built machines. Page245



● Photo—Courtesy Aerojet—Division of The General Tire & Rubber Co.

Working on rocket motors at Aerojet—Division of The General Tire & Rubber Company, this versatile 4' 9" column Cincinnati Bickford Super Service Radial is economically drilling and tapping in type 347 stainless steel.

Class 3 fit is required on the tapping operations of these $\frac{1}{2}$ " x 20" and $\frac{7}{16}$ " x 24" holes.

In this unusual installation a 12-foot pit permits processing of large work in vertical position, while another piece is set up on large V-block fixtures on plain box table.

The centralized controls clear view Bickford Head, and wide selection of speeds and feeds all bring ease and economy on this job.

Write for Booklet R-21-B.

.... **CINCINNATI
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio U.S.A.

AS THE

Editor

SEES IT

Our Crystal Ball Gazers Are Seeing Black Again

Our crystal ball gazers are knee deep in statistics, charts and trends, compressing a mass of facts and figures into prophetic announcements some of which are optimistic, others pessimistic. Economists have a difficult time extracting the identical answer from the same reports and statistics, leading me to believe, in brash and silly fashion, that some of them either do not know what they're about, or that they approach their task with a preconceived notion of what should be proved.

Economists are not deliberately drumming up black thoughts in the mind of the populace. Most of them are honorable and learned men who believe in a free America. But loose, pessimistic talk, not based on clear, incontrovertible common sense, can predict the country into an economic tailspin.

Let the public become worried and it stops buying and sticks its money into coffee jars. Business does not replace equipment and expansion programs are left to bleach in the sun. The eventual result? We've panicked ourselves into a first rate mess.

You may well ask, do the crystal ball gazers have some justification for their pessimism? They think they have, but let's look at their charts and reports: (1) the government is slowly applying brakes on the spending, due to the truce in Korea, (2) steel is below capacity, (3) machine tools shipments are off, (4) the farmers are in a plight. There are others, but these will suffice.

What are the actual facts?

1. We now have an honest dollar;

peace for which we've fought and prayed; the government is leaving business to business; price and wage controls have been lifted; inflation has been checked. Defense spending will not be halted because of the Korean truce; in 1954 it will be above 1953, and 1953 was above 1952.

2. Steel should never be at capacity for efficient operation. When a steel plant operates at 100% capacity it is utilizing costly marginal facilities, manpower, and materials. Even though steel production has fallen off, the industry is still producing more steel than it did a year ago. Steel capacity is at 95 while capacity during the peak war years, 1941-1945, was only 94.

3. July was the best month for new machine tool orders since May, 1953, and September, 1952. There is no sign that any kind of recession is going on in the industry.

4. Ever since I was a boy the poor farmer has suffered from maladjustment. He's the most maladjusted 'individualist' in the country. Maybe he is; all I know is that he nurses at the government's bottle constantly and energetically. He always suffers from special problems, in good times or bad. He's no barometer of the general economic life of the nation.

So all in all I see nothing to be frightened of except the development of a depression psychosis. Fact is, I believe in the future so firmly that I shall smoke an extra cigar after dinner and thus keep money in circulation.

William F. Schleicher

LeBlond Lathe eases cost squeeze ...on rolls that



A set of Shape rolls of 30 1/4" dia. x 51" body cast alloy semi-steel are turned to .005" tolerance in 94 hours on this 50" LeBlond Roll Contouring Lathe. Set-up time—1 1/2 hour. Clamped-on and brazed-on carbide tips are used at 48 rpm, .040 ipr feed. Conventional roll lathe took 245 hours for the same set of rolls.

squeeze channels from blooms

U. S. Steel

*Lops 151 Hours Off
245-Hour Roll-Turning Job.*

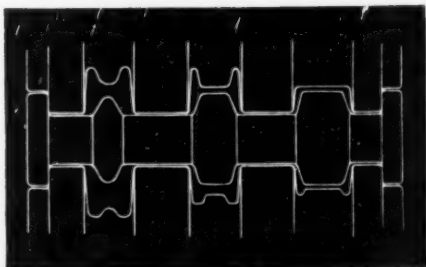
Every day at U. S. Steel's Clairton Works, Clairton, Pa., miles of "hotter-than-orange" steel are squeezed through the passes of rolls like these for reduction, elongation, shaping. They come out as finished structural steel for the "jungle-gym" frameworks of modern buildings. Turning these costly shape rolls with their steep-angle contours used to keep a lathe running 245 hours on a set of roughing rolls at U. S. Steel. Tool life was short and the job required highly skilled operators. Stepped-up schedules called for a new solution to this tough-nut production problem.

A LeBlond 50" Roll Contouring Lathe, as recommended by Pittsburgh Distributor, Barney Machinery Co., immediately slashed the 245-hour turning time by an astonishing 61.7%. Now U. S. Steel saves 151 hours on one set of roughing rolls—more than enough time to turn out two more just like it. Tool life is greatly improved and less experienced operators can handle the work.

The 50" LeBlond Roll Contouring Lathe is equipped with two-directional hydraulic tracing. A single valve automatically controls two hydraulic motors for cross and length feed. A stylus follows a flat template mounted at the back of the lathe. Feed and speed can be varied during a cut without leaving a tool mark. For roughing,

*Ask for complete information
on Roll Contouring Lathes in
25", 32", 40" and 50" sizes.*

Turned faster by



Typical roughing rolls for 8" channel

hydraulic cross feed can be by-passed and length feed used separately. This enables operator to cross feed manually, use template as length stop. Mechanical power rapid traverse to carriage and cross slide is also provided. All controls are located conveniently at the apron. The lathe uses a 40 constant horsepower DC motor, has nine speed changes in the headstock, delivers infinitely variable speeds from 1 to 165 rpm.

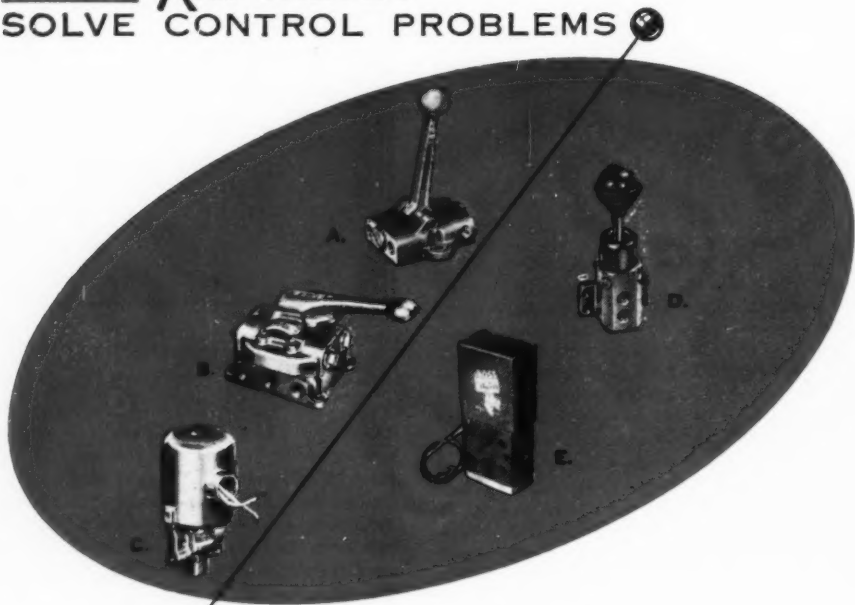
Whether your turning jobs involve specialized production like roll-turning, or call for high precision, high production—investigate LeBlond's complete line of 76 lathe models. LeBlond engineers will help you get a better turning job, faster. Write today or see your nearby LeBlond Distributor.



THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 66 YEARS

SMALL *Ross* VALVES SOLVE CONTROL PROBLEMS



Ross makes hundreds of valves especially designed for small, fast, single or double acting cylinder applications on all types of machine tools, jigs, fixtures, small punch presses and for remote pilot operation of large valves.

A. 600 series—three-way or four-way—hand and foot— $\frac{1}{4}$ " pipe—horizontal or vertical handle—single or double treadle.

B. 880 series—three-way or four-way—hand and foot— $\frac{1}{4}$ " and $\frac{3}{8}$ " pipe—horizontal or vertical handle—single or double treadle.

C. Inline direct operated solenoid

— straight-way and three-way — normally open and normally closed — $\frac{1}{8}$ " pipe.

D. Straight-way or three-way normally closed — $\frac{1}{4}$ " pipe — various heads.

E. Four-way direct operated solenoid— $\frac{1}{4}$ " pipe—can be converted to three-way by plugging cylinder port.

Large or small—Ross has the most complete line of operating valves in the industry. Ask Ross for any air control information.



Ross **CONTROL**
OPERATING VALVE COMPANY

108 E. GOLDEN GATE AVENUE • DETROIT 3 • MICHIGAN

LAST MINUTE WASHINGTON NEWS



by Arnold Kruckman

Washington Correspondent



In an address before the Congress of Freedom at Omaha, Dr. Willis J. Ballinger noted that one authority estimates that in the last 2000 years over 200 billion persons have lived upon the earth, and that 99½% of all the people who have lived on the earth in the last 20 centuries have lived as the slaves or the subjects of someone else. After years of research he was able to find only eight important free governments in 2500 years of world history. This spotlights the fact that

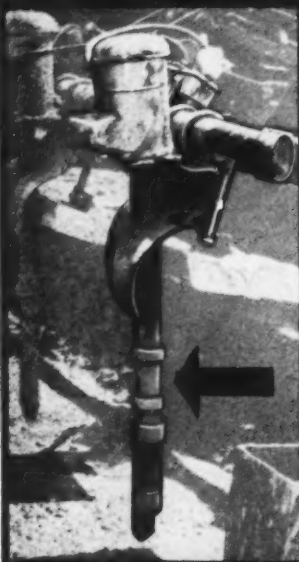
the United States is the greatest and most perfect development of free government. Dr. Ballinger wrote a book, "By Vote of the People," in which he picked the year 1956 as the year in which it would be irrevocably determined whether that would be the last chance to save freedom, so, "we must work fast."

Some two or three hundred organizations in all parts of the country sent delegates to the Congress of Freedom. They created a committee which has the task of making a study of the manner in which we have departed from our original constitutional government, and which will try to indicate what we must do and how we must do it to recapture the simple sort of government that it was intended the United States should have in perpetuity.

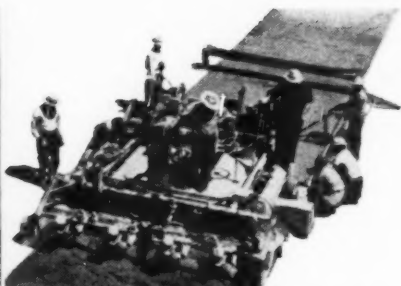
It is not many years since the public official was regarded and thought of himself as the servant of the people. That is definitely not true today. The public official in the nation's capital regards himself as an arbiter, as an aloof and superior being upon whom destiny has placed the power to rule. He honestly holds this belief after he has been in Washington a short time.

As the affairs of government have developed in the past twenty-five years Congress knows that it has no real control over the administrative agencies and the many branches directly under the executive. In essence those units grouped around the executive form the ruling oligarchy of this nation. The

**When
VIBRATION
is present...**



Close-up of a vibrating head.
Arrow shows location of
S.S. White flexible shaft drive.



...use

***S.S. White*
FLEXIBLE SHAFTS
to couple driving
and driven parts**

The non-rigid construction of an S.S. White power drive flexible shaft dampens vibration and prevents it from being transmitted from one part to another.

Take, for example, the multiple concrete vibrator shown above. This machine utilizes a series of motor-driven vibrating heads to compact concrete by high speed agitation. Using S.S. White flexible shaft drives between the motors and the heads enables the manufacturer to isolate the motors from vibration and shock, thus assuring longer motor life and fewer operating troubles.

S.S. White flexible shafts are also indicated where misalignment of a solid shaft may set up harmful vibrations. In such cases an S.S. White flexible shaft eliminates misalignment and vibration problems entirely. For full information, write for ...

THE FLEXIBLE SHAFT HANDBOOK

This 256-page designer's flexible shaft encyclopedia is yours for the asking if you write for it direct to us on your business letterhead.



**THE *S.S. White* INDUSTRIAL DIVISION
DENTAL MFG. CO.**



Dept. , 10 East 40th St.
NEW YORK 16, N.Y.

Western District Office • Times Building, Long Beach, California

various agencies have public liaison officers who are constantly in contact with Congress.

The new Hoover Commission will be much in the news in the coming months. Its searching inquiry will go much further than the first Hoover inquisition. It will cover not only the operation of government agencies, but the relation of the government agencies with business and with the individuals. This time the Hoover Commission has considerably more authority to make the results of its findings effective. Some of its hearings will be held in various parts of the country and it will use the most modern techniques in making certain that what it finds is reported to the taxpayers. Larry Richey, who was Hoover's most confidential man while he was president, will again be the most intimate channel for communication with Mr. Hoover.

The coming session of the Congress will also be focused on the nation's problems. It is growing more and more clear that one of the greatest fights will be about the needs for more jet planes. The conviction seems to be growing that it will be safe to limit the Army and the Navy, but that it is imperative to increase our air defense. Gen. Bonner Fellers, who was one of the notable officers on MacArthur's staff, says flatly that while we could not reach Moscow with any ease, the Russian planes could reach any city in the United States without much difficulty. The chief drive for more air defense comes from the public itself; and the members of Congress who are gradually coming back home from their various world tours are hearing from their constituents about the air needs. It seems very likely that there will be less money spent on the Navy and foot soldiers, and that what is saved will be spent on jets.

Next in line for Congressional debate is the Bricker amendment, which would limit the president's powers to make treaties or agreements, or any other contracts with foreign nations.

And of course another great fight is expected over taxes. Particularly if the administration tries to put through a sales tax. If congress could vote on the sales tax untrammelled by powerful pressures it would be voted down with a great majority. There is a tremendous sentiment abroad for the complete abolition of the Sixteenth Amendment - the income tax law. Those who agitate for it think the repeal is a complete cure for all our ills. The fight for its abolition is led by Mrs. Mary D. Cain, the editor of The Summit (Miss.) Sun, a lady who once ran for governorship of Mississippi, and achieved national conspicuousity when she was the first person to flatly refuse to pay the self-employment tax. There is no doubt the argument will have a tremendous appeal to the states, and it is seriously possible that the campaign may be put over. Those who have given serious thought to the subject feel that abolition of the Sixteenth Amendment at this time will be catastrophic.

Federal participation in education also will come under strong fire. A strange aspect of the federalization of colleges and schools is the charge that wherever federal funds and

in portable grinders...

YOUR BEST BUY IS BUCKEYE

grinder, naturally they specified Buckeye. Why?

Because their first Buckeye grinder, purchased in 1927, is still in use after 25 years grinding gray iron castings without any down-time for major repairs.

In fact, when this "veteran" finally came back for reconditioning, the original cylinder showed no measurable signs of wear. The only parts replaced were three inexpensive rotor blades.

Unusual? Perhaps, but it does indicate that a Buckeye grinder will provide exceptional service, even on the toughest grinding applications. There are 55 grinders listed in our Air Tools Catalog, one of them designed just for your kind of grinding work. Write today for your copy.



Buckeye Tools
CORPORATION

DIVISION 14 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools

federal influence goes there are introduced subversive influences. An amazingly interesting document on the subject has been prepared by Congressman Shafer of Michigan. Write him for a copy.

* * *

America's small business men were given a big shot in the arm by the Small Business Administration when that agency's policies for the new fiscal year were just recently aired. The SBA is successor to RFC's small business and disaster loan functions. William D. Mitchell, administrator, announced that the \$55,000,000 revolving fund would be available for loans which would "... assist, expedite, increase or maintain the production necessary to meet military, defense or essential civilian requirements."

Such a pronouncement is important in the light of the fact that the approximately 4,000,000 small business concerns of all kinds make up over 95% of all American business, numerically.

Outlined were SBA's programs for giving small concerns equal opportunity to share in "the growth of the American economy" through providing "a fair small business share of contracts and orders, public and private," and for furnishing assistance in solving managerial and technical problems of the small firm—"... one that is independently owned and operated and which is not dominant in its field of operation ... may also use the number of employees and the dollar volume of business of the firm," to determine category.

Loans not to exceed \$150,000 to any one borrower will be made directly to small businesses, or through participation with banks or other lending institutions. If financial assistance is otherwise available on reasonable terms, the application will be denied.

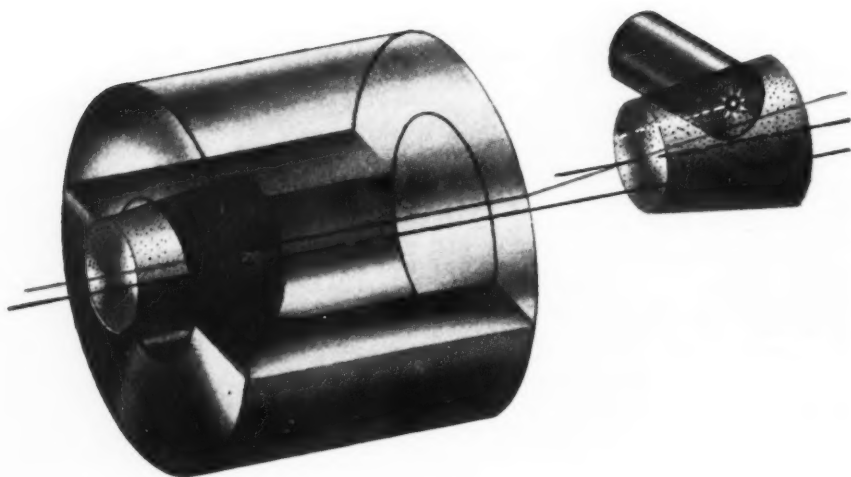
The period of SBA loans may not exceed ten years, plus time for constructing industrial facilities. No loan will be made unless there exists reasonable assurance that it can and will be repaid pursuant to its terms. Also, no loans will be made for speculation in any kind of property, for eleemosynary institutions, or recreational or amusement facilities, newspapers, magazines, radio or television broadcasting, alcoholic beverages, gambling operations, or if the effect is to encourage monopoly contrary to the American system of free competitive enterprise. Interest will be charged at rates that are appropriate, taking into account all the circumstances.

Preliminary screening and examination of loan applications will be done at the local level—there are 13 regional SBA offices, and 17 branch offices. Regional offices include: Boston, New York, Philadelphia, Richmond (Va.), Atlanta, Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Denver, San Francisco and Seattle.

Branch offices are located in Buffalo, Pittsburgh, Baltimore, Birmingham, Nashville, Cincinnati, Detroit, Indianapolis, Madison (Wis.), Davenport, Omaha, St. Louis, Houston, New Orleans, Oklahoma City, Los Angeles, and Portland (Ore.).

alignment

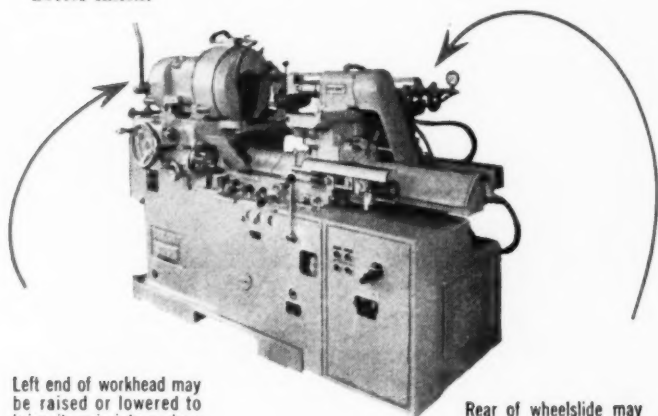
for better internal grinding



IT is common assumption in internal grinding that once the grinding wheel passes the diamond, all errors will be eliminated and the wheel will be a perfect cylinder. It is also assumed that this grinding wheel can produce a straight hole. These two assumptions are true if the wheel path is a straight line parallel with the axis of the wheel as it passes the diamond and traverses the work.

In the illustration, the wheel slides are badly worn and the wheel path is not a straight line. The distortion in the ways causes the wheel to move gradually away from the diamond and the wheel is dressed to a taper as it passes the diamond. Then, as the tapered wheel traverses the work, it will grind only on its large diameter. At the point of reversal the tapered form will be transferred to the work. If the traverse stroke is lengthened, the tapered section will be moved to the new point of reversal. In addition, wheel wear will be excessive, finish will be poor, feed lines may be visible.

Available information advises simply turning the workhead or changing the length of traverse to correct taper. In the case illustrated, neither turning the workhead nor changing the length of traverse will produce a straight hole. The only possible remedy is to straighten the wheel slide ways which will, in turn, straighten the wheel path. The wheel will then contact the work properly, producing correct geometry of the hole, longer wheel life and better finish.



Left end of workhead may be raised or lowered to bring its axis into a plane parallel with wheelslide bar.

Rear of wheelslide may be adjusted to insure straight line motion of the wheel.

This machine is for general purpose hole grinding. It has convenient centralized controls and all features necessary to handle a variety of work with minimum time and effort needed for changing jobs. For stable 3-point support, the wheel spindle is mounted on a cylindrical bar which is supported on 2 cylindrical bearings. The rear of the slide is supported on a hardened and ground guide plate. Workhead may be swiveled for grinding tapers up to 90° included angle. Provision is made for mounting a face grinding spindle in addition to the hole grinding spindle. The No. 1116 will swing 16" with 12" max. hole depth. Write for folder.

Write for "Alignment" booklet which gives complete details on this interesting subject. Also ask for booking form on new sound, color movie — free showings arranged for engineering groups.

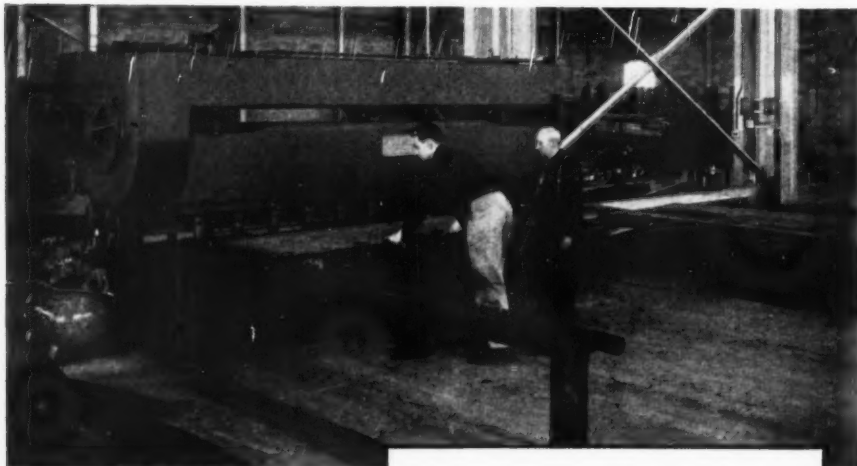
Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

Internal Grinders • Internal & External Thread Gages • Granite Surface Plates • Boring Machines

Series No. 4B12 Steelweld Shear. With more than a half century of experience in steel warehousing, Enos & Sanderson know what good shearing is.

They are proud of this machine. They advertise that "Trained shearing teams will give you the finest edge ever cut with this Steelweld."



"NEVER SEEN A SMOOTHER OPERATING SHEAR"

Steel Warehouse Elated with Steelweld Shear

For 57 years The Enos & Sanderson Company, Buffalo, N. Y. has been supplying steel sheets and plates to hundreds of Niagara Frontier factories. Recently they installed a Steelweld Shear in their new warehouse. This is used for cutting various thicknesses to 1 4" x 12", as per customer orders. Cuts must be smooth, straight and accurate. Speed is essential to provide best service possible.

Enos & Sanderson's new
25,000 sq. ft. steel warehouse



The following paragraph in an unsolicited letter from Enos & Sanderson indicates how well their Steelweld Shear is serving their needs:

"We are extremely satisfied with the operation of this unit and would recommend this machine highly to anyone. A rigger, who set up this shear for operation, remarked that, in his twenty-five years of work with shears of all types, he had never seen a smoother operating shear in his experience."



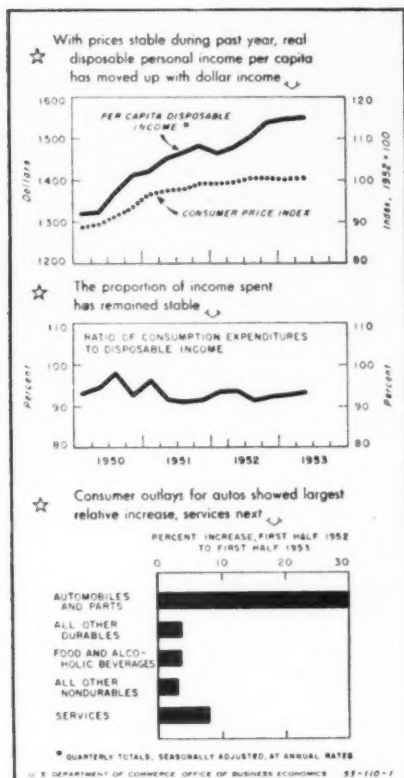
GET THIS BOOK!

CATALOG No. 1011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
5235 E. 282nd Street, Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

How's BUSINESS ?



The chart shows how widespread employment and gradually rising pay scales have kept the nation's payroll edging upward. Over the past year the rise in personal income has outstripped population growth. Disposable income per capita has risen. Consumer prices have been steady so that the advance in real disposable income per capita has approximately paralleled it in current dollar income.

American business is planning capital outlays of \$14.4 billion for the last six

months of 1953, according to latest survey of plant and equipment expenditures conducted during August by the Department of Commerce, and Securities and Exchange Commission. Outlays for the full year of 1953 are expected to amount to a record \$27.8 billion, about 5% more than last year.

The Small Business Administration

The SBA's job is one of assistance and cooperation with state and local governments and all segments of the population in solving problems of small business at the state and local levels, public and private. Approximately 4,000,000 small businesses are the concern of the administration.

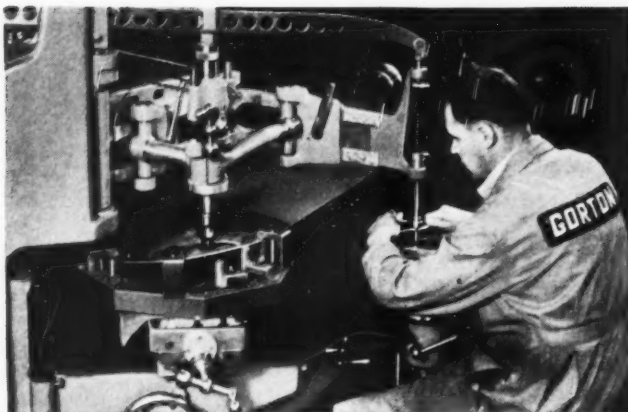
Believing that the long-range problems of small business cannot be met with government hand-outs, red tape, and orders and directives from Washington, the agency will station numerous staff members in its field offices, close to state and local governments and business and civic groups who will be relied upon to help carry out the programs. The agency will be composed of people who know their jobs and know the problems of small business.

Primary needs of small business firms, which make up more than 90 percent of all American businesses, are:

First, it needs access to adequate sources of capital and credit on reasonable terms. The financial problems of small business cannot always be met by banks and other private institutions because of legal and other restrictions. This is particularly true with respect to urgently needed long-term credit. Short-term and intermediate-term credit needs of small firms can usually be met by the banking system.

Second, it needs greater opportunity to share in the growth of the American economy. Small business should have a fair share of Federal Government contracts, and also equitable treatment in orders by State and local governments, and large private industries.

Third, many small firms need managerial



Tracer-Controlled Pantograph cuts and rounds thermal slot in 8-foot steel propeller blade in 40 minutes; previous time was 5 hours, 10 minutes — just one of hundreds of examples of time and cost saving with tracer-controlled Pantograph machines.

Pantography IS NEW —

By George Gorton III
Executive Vice President
George Gorton Machine Co.

INDUSTRY'S foremost responsibility right now is to produce faster, to highest quality standards and at lower cost — whether on defense contracts or for our civilian needs.

Today, there are literally thousands of operations being performed throughout industry which can be speeded up, improved in quality and lowered in cost by the use of available models of special machine tools. The modern tracer-controlled Pantograph machine is such a tool. It is both a special purpose machine, ideal for short runs, and it is an accurate single purpose machine which turns out identical parts or pieces to meet tight production schedules.

The tracer-controlled Pantograph machine is used for inside and outside profiling, routing, die sinking, mold cutting, counterboring, contour milling, chamfering, grooving, graduating and engraving in ferrous and non-ferrous metals, as well as in plastics.

This machine performs on flat, uniformly curved, cylindrical, spherical or

— in the sense that industry at large and Metal Working people in particular are just beginning to appreciate the many advantages Pantography offers to those faced with the Design-Production problems of today and tomorrow.

irregular shapes — it works in either 2 or 3 dimensions, in all directions on a horizontal plane, and vertically. It employs enlarged masters, templates or patterns which are quickly and easily made and operates normally at a reduction ratio thereby increasing accuracy — exclusively characteristic of the pantograph.

Single or repetitive accuracy — from one piece to thousands — manual or full automatic operation depending upon quantities — work sizes from the size of a dime to as large as 10 feet.

A new booklet, "Pantography," explains the process and shows what this type of machine can do for you. It is yours without obligation. Write for it today. If interested, also ask for our latest General Catalog 1655. Address the George Gorton Machine Co., 1411 Racine St., Racine, Wisconsin, U. S. A.



and technical consultation. Many small firms with technical problems cannot afford to employ engineers to help solve their difficulties.

SBA has specific programs in each of these areas.

First, SBA is fostering the development of State-wide and local pools of private capital, in which banks and other financial institutions, business and civic leaders, and individual citizens can participate.

SBA is prepared to do its part with the \$55,000,000 revolving fund which the Congress provided for small business and disaster loans during the present fiscal year. But this is only a drop in the bucket compared to the total needs. If the entire \$55,000,000 were released in loans to small firms at once, it would scarcely make a ripple in the national economy.

The agency intends to use these funds prudently as a means of stimulating broader private financial assistance to small firms, through participation in loans with banks and other private lenders.

This plan is realistic. It has been tried and proved in some States and local communities. The State-sponsored credit pools in New England, for example, have attracted much attention. But the surface has barely been scratched in this field.

Second, SBA is developing a program whereby new products and new methods



William D. Mitchell, Administrator of the Small Business Administration

Mr. Mitchell, 41, was counsel and assistant to the president of the Quick-Way Truck Shovel Co., Denver. During the war he served as chief of the Military Supply Division of the Denver District, Corps of Engineers. He was promoted to the rank of Major while serving in the Western Pacific area.

Mr. Mitchell is a member of the Bar of the District of Columbia, United States Supreme Court and the State of Utah, and member of various trade and fraternal organizations.

Index of new orders and shipments of machine tools

source: National Machine Tool Builders Association

Month	Domestic	Foreign	Shipments	Ratio Unfilled Orders to Demonstrated Production Rate
April	293.5	15.6	307.9	14.8 - 1
May	284.6	31.4	323.0	13.6 - 1
June	342.9	20.3	330.8	12.6 - 1
July	374.6	14.9	257.2	12.6 - 1
August	309.1	22.7	314.8	12.4 - 1
September	302.4	23.1	368.6	11.8 - 1
October	243.3	22.5	338.2	11.1 - 1
November	205.4	14.3	342.5	10.3 - 1
December	225.2	19.6	355.0	9.8 - 1
January	255.8	26.3	361.6	9.4 - 1
February	282.1	22.9	354.5	9.0 - 1
March	323.3	17.5	375.7	8.5 - 1
April	276.8	13.9	372.7	8.0 - 1
May	246.4	14.7	356.4	7.7 - 1
June	273.4	16.6	342.2	7.4 - 1
July	247.3	18.6	267.6	7.4 - 1
August	p. 287.9	p. 17.8	p. 301.4	p. 7.3 - 1

November, 1953

Complete Uniformity in all
PUTNAM End Mills



Here are the end mills you can count on for fast, free cutting and extra long life—a bonus provided by complete uniformity and assured by Putnam's rigid quality control. For more work for your money, specify Putnam High Speed End Mills. Over 1000 standard sizes and types available.



PUTNAM

2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

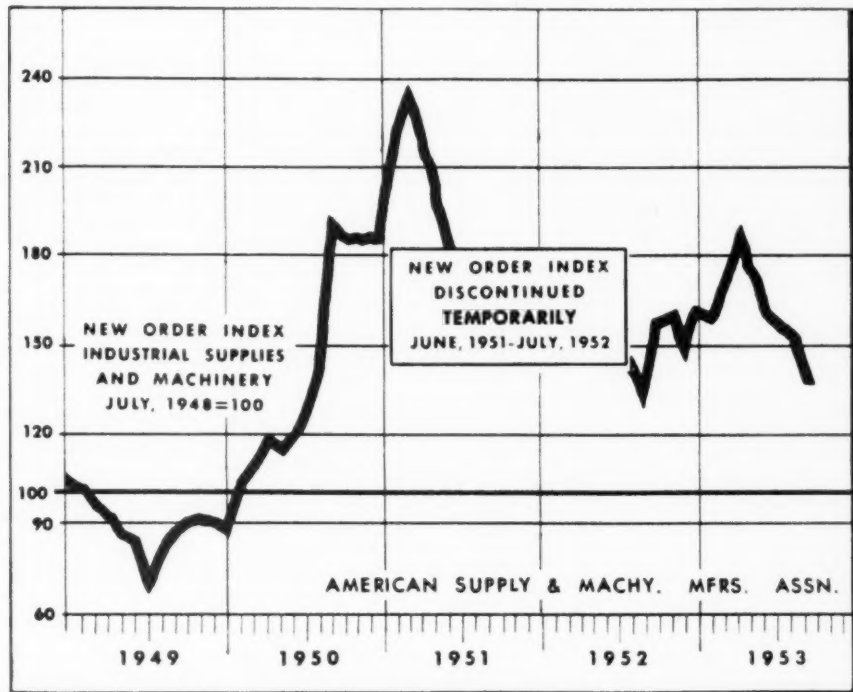
of production will be opened up to small concerns for their own adoption. As an example, there are more than 19,000 inventions in which the Government has an interest, that in many instances can be made available to small plants.

Third, SBA will stimulate the use of home talent and know-how to assist small firms with managerial and technical problems. For example, experts of various kinds in universities, colleges and in civic and business organizations can be helpful to

small enterprise through a cooperative endeavor.

Assistance will also be given to small firms in the areas of materials and equipment, subcontracting opportunities, certificates of competency, tax amortization, and in solving problems arising in the transition from defense to civilian production.

In short, the programs of SBA in all fields are designed to generate self-help and cooperation at the grass roots level.



New Order Index, Industrial Supplies and Machinery

New orders for industrial supplies and machinery are now being placed at a rate of 40 percent above the base period of July 1948. This is revealed by the new order index maintained by the American Supply & Machinery Manufacturers' Association, whose members sell to industry through industrial distributor organizations (mill supply houses).

The index measures the volume of or-

ders received by contributing Association members from distributors who supply industry.

The all-time high since the index was started was reached in February 1951, with a peak of 239. The index fell to a low of 129 in August 1952. The latest peak occurred last March when the index rose to 188. The latest figure (August 1953) is 140, which compares with an index of 129 for August 1952.



Letters TO THE EDITOR

Tough Machining Problem Answered

In your Letters to the Editor, August, 1953, under the heading of "Painted Castings Present Problems," we may have a solution for Mr. Neil A. McLaughlin, West Hanover, Mass.

The regular commercial counterbore having 4, 5 or 6 flutes rides around on the top of the casting and wears the cutting edges dull on primary land before the counterbore has an opportunity to break through the scale and we have always found that a lesser number of flutes in the counterbore, especially on cast iron, breaks through the scale faster with a heavy feed and overcomes the breaking down of the cutting edges.

We manufacture three different types of counterbores, all of them made in 3 and 5 flute form with the odd number of flutes to eliminate chatter. We carry a nominal stock of 3 flute counterbores in sizes from $\frac{1}{4}$ " to $1\frac{1}{4}$ " diameter.

We will be very glad to send Mr. McLaughlin a copy of our general catalog if you will advise us his mailing address.

*B. O'Meara
The Gairing Tool Company*

Thanks to reader O'Meara for his help. Mr. McLaughlin's address has been forwarded.

Who Makes . . .

Will you please send us full name and address of Shuster Mfg. Co., covering

their wire straightening machine and automatic cutoff with feed machines.

If you have any such manufacturers listed that make that type of machine will you please send their names and addresses.

*Martin Friedland, Treas.
Armart Manufacturing Co.*

We suggest you contact:

Shuster Wire Machine Div., Mettler Machine Tool Co., 19 Congress Ave., New Haven, Conn.; A. H. Nilsen Machine Co., 1511 Railroad Ave., Bridgeport, Conn.; Producto Machine Co., 960 Housatonic Ave., Bridgeport, Conn.

Would you please put us in touch with a supplier of small gear cutters for watch and clock gears.

*Harold G. Burrill
Harold G. Burrill and Assoc.*

Waltham Machine Works, Waltham, Mass.; Barber-Colman Co., 745 Rock St., Rockford, Ill.

One of our subscribers has a customer who is in the market for a New Holland Stone Crusher. We are unable to locate the manufacturer of this item. Since your records are certainly more complete than ours, we would appreciate your giving us the name and address of the manufacturer.

*Frank Dattal
Oliver Brothers, Inc.
New York City*

The Iowa Mfg. Co., Cedar Rapids, Ia.,

purchased the New Holland Co. The stone crushers may be obtained from the Iowa Co.

American Built Machine Tools

I should be grateful if you could let me have three copies of each of the reports No. 1 to 29 inclusive.

The information contained in these reports is of great value to the lecturing staff of my department.

*J. Danks, Sen. Sup. of Eng. Trades
Department of Technical Education
Sydney, Australia*

The first printing of American Built Machine Tools is completely exhausted and a second printing has not yet been received from the printer. The first volume includes the first 16 reports; the second volume will include the next twenty reports and will be published in

March, 1954. As soon as Vol. 1 is received copies will go forward.

Who-When Cards

Would it be possible to obtain about four copies of your "Who, if not you . . ." cards? Three for the office and one for my boy's room.

Another card I remember was 5 x 8 yellow card imprinted with a bold black face, reading: "A year from now, what will you wish you had done today?"

*Robert D. Berry, Mgr.
Dean and Associates*

Thanks to reader Berry for drawing our attention to the yellow card. Four Who-When cards have gone forward.

Incidentally, it might be of interest to know that to date almost 750 cards have been printed and distributed to the metal-working industry. We'll keep printing them as long as the demand exists.

Planned Machine Tool Replacement Lowers Cost

No live industry can keep pace with the advance of technology without continuous renewal and transformation of its productive facilities. Any equipment which does not meet the challenge of new and more modern machines must be displaced, regardless of its age or condition and whether it is physically worn out. A re-equipment policy that fails to give full recognition to obsolescence is bound to lead to abnormally high production costs and inefficiency. Because new equipment costs too much to discard existing facilities every time there is an advance in the arts, the installed capacity of industry necessarily lags, on the average, far behind the best that is currently available. The problem is not to eliminate the lag but to hold it to the lowest limits that are economically justifiable.

To answer the challenge for more and better products at lower costs in the years to come, management's answer will need to be more output per man-hour. Capital investment for better plants, better production equipment, and better working conditions must be well planned. All too often in the past decisions on the replacement of equipment have been made by rule-of-thumb methods instead of by complete analysis based on sound business principles and economics. That much of American industry is still relying on primitive devices of the past to determine machine replacement is not only inconsistent with modern methods but a challenge to every business executive.

Carl M. Beach, vice-president, Cincinnati Milling Machine Co., speaking before the fall meeting of the American Society of Mechanical Engineers, Rochester, N.Y., October, 1953

Please mention MACHINE and TOOL BLUE BOOK when answering advertisements, or use the handy Reader's Service Card on page 64.

How to get

5 days' production in 3

with Ledloy the fastest cutting steel

The outstanding performance of Ledloy is being duplicated daily in shops throughout the country. Job after job shows that Ledloy effects overall savings of 20% or more, because it machines 30% to 50% faster than B 1113 and extends tool life as much as 200%.

Lead—so finely dispersed it cannot be seen with a microscope—lubricates this remarkable open hearth steel. The result: reduced friction between steel and cutting

tool. And Ledloy machines to an unusually clean smooth finish—case hardens effectively — bends, crimps, swedges or rivets easily.

Your nearby Ryerson plant now has large stocks of Ledloy rounds, squares and hexagons in a wide range of sizes. So get all the facts from your Ryerson representative or write for engineering data on Ledloy. And call Ryerson for quick shipment of this remarkable new free-machining steel.

Principal Products: Carbon, Alloy & Stainless Steels, — Bars, Structural, Plates, Sheets, Tubing, Machinery & Tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS
LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Feeding Short Strip Stock to be Formed, Extruded, and Embossed Through a Progressive Die

IN DISCUSSING the topic of transmitting a piece part through a progressive die we must enlist our imaginative powers in order to clearly understand our topic. To help, let us visualize sliding an ordinary wood plank across an open floor. We can easily see that the board will slide without interference. Now drive a nail through the board letting it protrude. If we were to slide this plank across the floor again we can easily see the interference. By the same comparison, a sheet of steel going through a progressive die will at various times be pierced, formed, extruded or embossed. Any combination of these operations or all can be done in a progressive die. However, to do these operations certain designs must be incorporated in the die; otherwise, like the plank with the protruding nail, it will fail to advance with the same smoothness as the plank without the nail.

Our topic will be further analyzed according to dies that have automatic coil feed stock arrangements. Here we depend on pilots for accurate locations,



By **Paul Prikos***

Prikos & Becker Tool Co.
Skokie (Chicago), Ill.

keeping in mind that modern day feeding mechanisms will help locate the progression of the part in the die very closely. Nevertheless, good die making dictates that pilots must be incorporated in the design of every high grade progressive die; furthermore, because there are a large number of combinations in forming and extruding operations, we will show a few typical examples of how to overcome these odd situations in a progressive die.

We begin with the standard method of

*Mr. Prikos is Consultant Tool and Die Editor of MACHINE and TOOL BLUE BOOK. He is also a member of BLUE BOOK's Editorial Board.

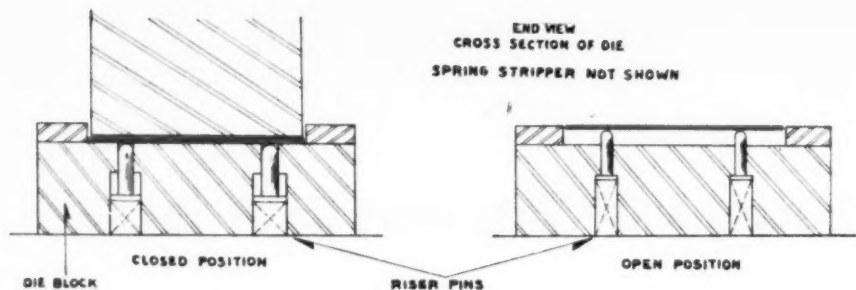


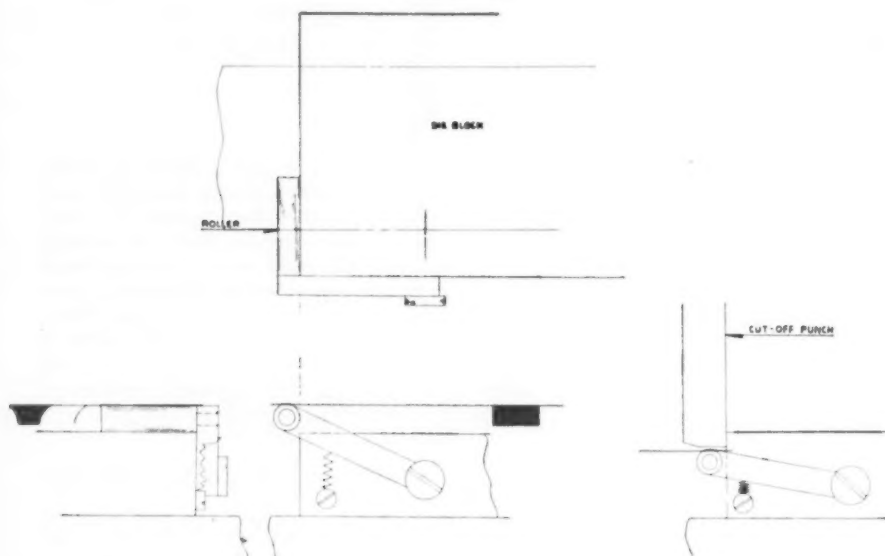
Figure 1

pierce and pilot. This means we should pierce either given location holes incorporated in the piece part, or pierce holes in the scrap (if there is any). Also try to select holes that are large enough to allow accurate locations and sturdy punches and pilots. Furthermore, use holes that will not be distorted by a

very immediate draw or form. The latter will have a tendency to give improper pilot location.

When the piece part required from the die has short forms, shallow draws, or stubby extrusions, a popular method of carrying along the stock is with the use of riser pins, figure 1. The spring

Figure 2



pressure under these pins is light, just enough to lift the weight of the stock above the die block surface, and high enough to clear any of the metal piece part formed in a downward direction. The riser pins should be located at such points as to be equally distributed and not interfere with the smooth advance of the stock. These riser pins can be used with both stationary and spring strippers—making certain in the stationary stripper that sufficient area is provided to allow the stock to ride above the die block surface.

Sometimes, instead of using riser pins we incorporate a roller type arm attached to the die block, figure 2. The reason for this is: in certain die designs there are perforations or staggered notches that would interfere with the riser pins. Here the arm type rollers would be located at such points (for example at the beginning and end of the die) to avoid these interfering forms and stock openings.

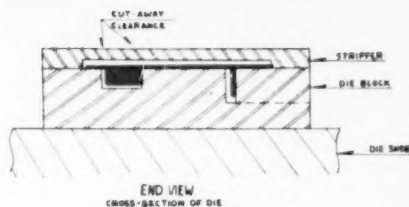
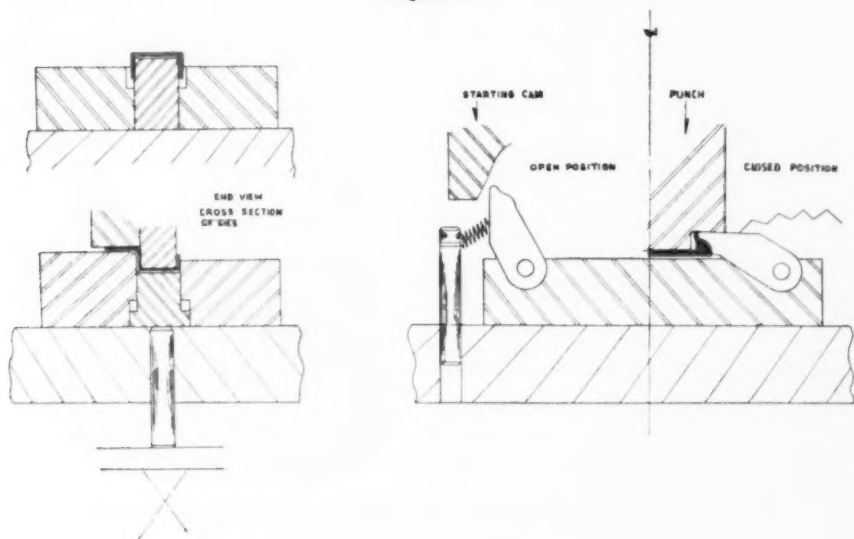


Figure 3

Another method of lifting stock is by attaching hook-like levers to the punch holder section that would lift the stock as it ascends with the ram of the press while in operation. We have avoided this accepted method because many times a die will be set up in a press with a long shut height and material will be pulled so high that it will fail to function properly. It should be mentioned though, in secondary operations such as forming, the hook-like levers are excellent for speedy removal

Figure 4



of a formed part. The setup is usually on an inclined press, permitting the operator to devote more time to pick up the next piece part instead of being troubled with additional lost motion imparted by the necessity of removing the finished part from the die. In a mass production industry such operations are important and well worth investigating.

On all extrusion operations it is advisable to have spring pins in the die opening (when extrusions are down into the die block). This helps in the support of the extrusion operation and primarily it will eject the part from the hole. Many times the extrusion has some "ironing" on the sides to give it the required length. When this is done the extrusion will fit tightly in the cavity or opening in the die block. Naturally, the extrusion will have a tendency to stick. The spring pin will then act as an even pressure ejector.

Embossed parts or even very shallow drawn parts can be fed through a pro-

gressive die when held in the strip by the same manner as described so far. We must make certain that in the successive and idle stations of the die, clearance or cutways are provided to allow the strip to advance without interference, figure 3.

Formed parts are perhaps the most difficult to overcome. One reason is that they can be of many odd shapes and lengths. Spring pads, cam actions, channels, cutways, and even bridges of a sort must be built into the die. It is essential to note that in any aggregate grouping of pads, and cam action devices, timing is important. For example, the die engineer or die maker must consider that such acting members should not interfere with the forward motion of the stock. For a better method at this time a series of small sketches of pads, cam actions, channels, and bridges are shown in figure 4.

The End

Depend on G&M's VERSATILITY for

Years of experience in every field of mechanical tool design go into the manufacture of our custom-built machines.

This multiple spindle drill is just one example of G&M design. Bores 18 holes (3/16" dia.) simultaneously in hollow spindle . . . handles 400 piece parts per hour . . . is completely automatic—operator need only position piece part . . . has coolant tank and extra heavy-duty pump which floods fixture for cleaning.

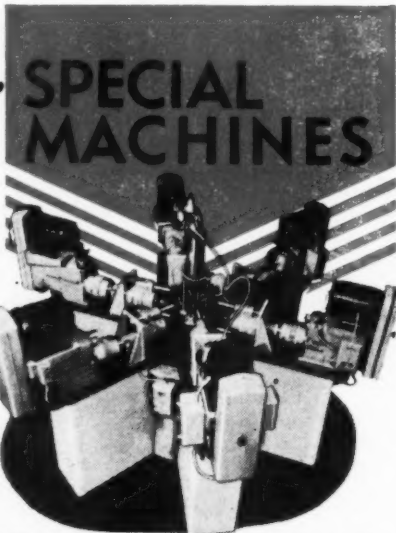
We will design and manufacture, or manufacture to your design, any machine in any manufacturing field.

Ask about our "low risk" plan for experimental machinery.

Write Dept. MT-1



GORDON & MORGAN MACHINE CO.
3725 Touzalin—Lincoln, Nebr.



TO

GEAR MANUFACTURERS

Exclusively

if

you have trouble meeting production schedules,

if

you have trouble meeting precision tolerance specifications.

YOU

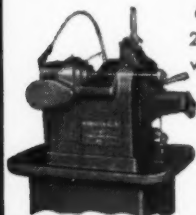
should "read-up" on the HAMILTON® line of Small-Gear, Precision Hobbing Machines!

3

THREE PRECISION MACHINES to meet your every requirement.

HAMILTON No. 00

For the generation of spur gears and pinions only.



Capacity:
2" O.D. of
workpiece.

HAMILTON No. 1

Hobs spur and spiral gears, worm gears and worms (to three thread), splined shafts, gear sectors, and pinions.

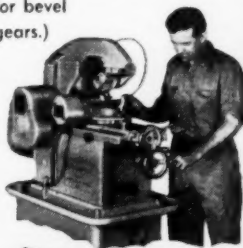


Capacity:
6" O.D. of
workpiece.

HAMILTON No. 1-B

Generates any shape that can be made on the No. 00 or the No. 1 machines, plus bevel gears and face gears.

Capacity: 6" O.D. of workpiece (3" O.D. by 3/16" face, for bevel gears.)



Exclusive Greater range of hob spindle speeds: 109 to 1259 R.P.M. — 12 speeds.

Exclusive Speed, feed, indexing. Each can be selected independently. This, and wide range of hob speeds, adds flexibility: reduces set-up time; gives quick selection of speed and feed to suit material and gear size.

Exclusive Alignment and trueness of work and hob spindles are held to within .0002".

Exclusive Generates gears from 3 teeth to 1200 teeth.

Exclusive Accumulative error of not more than .0002" guaranteed.

THE COMPLETE STORY

will be sent to you free for the asking. Request

BULLETIN GH-5310 DO IT NOW!



THE

Hamilton

TOOL COMPANY

826 SO. NINTH STREET • HAMILTON • OHIO • U.S.A.



Which Grade of Carbide Should You Use?

By **Guy Monacelli**

Sup. Eng. Carbide Design and Application
Superintendent

Eng. Carbide Design and Application
Carboloy Dept., General Electric Co.
Detroit, Michigan

PROPER understanding of the various grades of cemented carbides results in better finishes, greater accuracy, lower production costs and longer tool life. Tool design also is important. Benefits derived make good design worthwhile to gain savings in materials and other machining functions.

A well-designed tool costs less in the long run. It lasts longer—does its job more economically. Good carbide tool design generally is dependent on the same factors that govern the design of other types of cutting tools. The

material to be cut, depth of cut, number of pieces, etc., must all be taken into consideration. Any one or a combination of these factors affect the design, not to mention the work.

Another important consideration in applying carbides is cutting speed. Years of experience with machining steel proved that there is a relationship between steel hardness, depth of cut, cutting speed and feed for a specific tool life. If you know the hardness of a given steel, it is possible to select a suitable starting cutting speed for a given depth of cut and feed per machine revolution.

Getting back to grades of carbides, there are today several grades made by Carboloy Department that can be used for cutting steel, cast iron and nonferrous materials. Some of these are for precision finishing, finishing and light roughing, heavy duty or inter-

Note: It may interest many readers to know those carbide designations of other manufacturers which correspond to the Carboloy designations used in this article. Consequently, we have appended, at the end of this article, a chart giving comparable grades of all carbide manufacturers.

rupted cuts and general purpose machining.

Making a selection in cemented carbide tools today is a far cry from that of 25 years ago when carbide development was in its infancy and only one grade was available for all machining tasks. Today, just as the design engineer now has a choice of many engineering materials for various work parts or components, selecting them for their toughness, hardness, ductility, lightness in weight or strength in creating a new development, so has a cutting tool supervisor a choice, with various grades of carbide at his disposal to best meet machining conditions presented when cutting these materials.

Some engineering materials, for example, have a high abrasive action on cutting tools; others produce a cratering action in addition to some abrasion. Abrasion is the tendency of the work material to grind away the clearance of the cutting tool, and cratering is the tendency of the work material to dig a pocket on top of the cutting tool.

Plain cast iron and nonferrous materials such as brass, bronze, etc., are highly abrasive and wear cutting tools rapidly. To counteract the abrasiveness in these materials, straight tungsten carbide grades like 883 and 44A are used. Many of the difficult machining jobs in cast iron and nonferrous materials can be overcome with special

Proper tool also calls for proper setting. Here operator is just setting up a steel run. Note how he makes final tool adjustment with carriage while machine is running and work revolving.

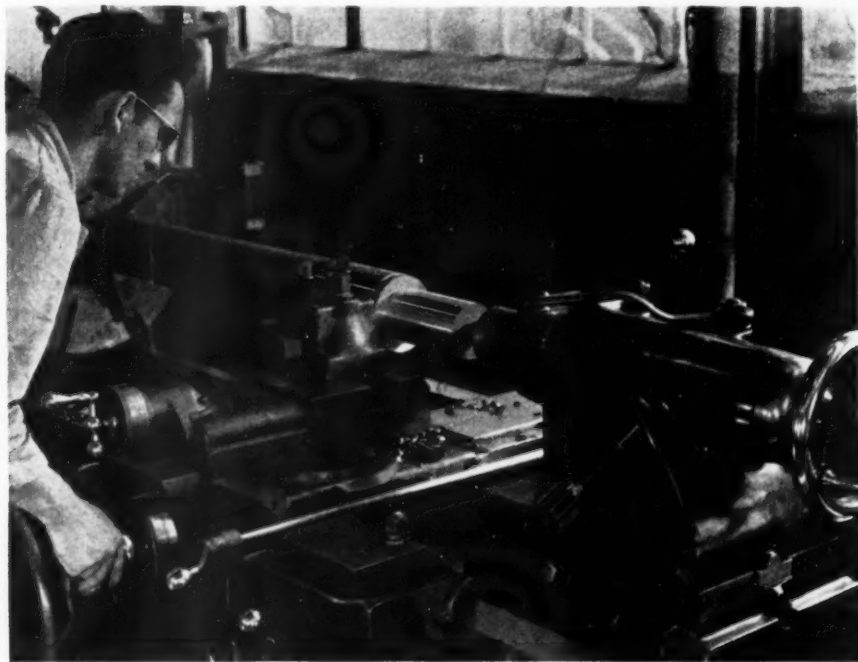


Table 1. Carboly Recommendations for Steel Cutting. Average work.

MATERIAL TO BE CUT		POWER CONSTANT	1/4" to 1/2" Cut 0.00" to 0.00" Feed		1/2" to 3/4" Cut 0.01" to 0.05" Feed		3/4" to 1 1/2" Cut 0.10" to 0.20" Feed		1 1/2" to 1 3/4" Cut 0.20" to 0.12" Feed		0.05" to 1 1/2" Cut 0.07" to 0.08" Feed	
			Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade
CARBON	SAE 1015-1025	6	175-325 250	78B	200-400 300	78B 78	275-475 375	78	375-625 500	78 831	800-1500 675	831
	SAE 1030-1095	8	125-275 200	78B	150-350 250	78 78	200-400 300	78	300-500 400	78 831	400-1000 550	831
IRON CASTING	SAE 1112-1120	6	175-325 250	78B	200-400 300	78B 78	275-475 375	78	375-625 500	78 831	800-1500 675	831
	SAE X1314-X1340	6	150-300 225	78B	175-375 275	78B 78	250-450 350	78	350-550 450	78 831	400-1200 600	831
MIL	SAE T1130-T1150	9	100-250 175	78B	125-300 200	78B 78	150-350 250	78	250-450 350	78 831	300-800 475	831
NICKEL	SAE 2015-2120	7	150-300 225	78B	175-375 275	78B 78	250-450 350	78	350-550 450	78 831	400-1200 600	831
	SAE 2330-2515	9	125-275 200	78B	150-350 250	78B 78	200-400 300	78	300-500 400	78 831	400-1000 550	831
NICKEL CHROME	SAE 3115-3140	8	125-275 200	78B	150-350 250	78B 78	200-400 300	78	300-500 400	78 831	400-1000 550	831
	SAE 3145-3450	9	100-250 175	78B	125-300 200	78B 78	150-350 250	78	250-450 350	78 831	300-800 475	831
MIL	SAE 4130-4820	9	100-250 175	78B	125-300 200	78B 78	150-350 250	78	250-450 350	78 831	300-800 475	831
	SAE 5120-52100	10	100-250 175	78B	125-300 200	78B 78	150-350 250	78	250-450 350	78 831	300-800 475	831
AL	SAE 6115-6195	10	100-250 175	78B	125-300 200	78B 78	150-350 250	78	250-450 350	78 831	300-800 475	831
	SAE Cast Steel	9	125-275 200	78B	150-350 250	78B 78	200-400 300	78	300-500 400	78	300-800 550	831

Grade, in dark type, has wide margin of safety, may be used with good results on average work. Grade in light type provides additional selection when desiring specific improvements in tool performance. Speed, in dark type, can be adjusted up or down to meet specific job requirements within ranges shown in light type. Usually speeds should be adjusted upwards for soft steel, under 200 Brinell and downwards for hard steels.

Carboly grades such as 999, 905 and 55A.

Cratering in steels can be overcome by using carbides containing tungsten with tantalum or titanium or both. Such grades as 831, 78, 78B and 78C include varying degrees of hardness and toughness to meet specific machining needs in cutting steel.

In cutting aluminum and magnesium alloys, both nonferrous materials, grades 44A, 883 and 905 produce the best results. These resist the abrasive action of the material.

Certain engineering materials possess unusual machining characteristics. Among these are stainless steels, Hadfield manganese steel, certain centri-

fugally cast and malleable irons, and some metals referred to as semisteels. These present what may be called borderline cases of tool application. When machining these materials, close study must be made to determine what type of wear they cause on the tool to select the proper grade of carbide. Tables 1 and 2 include Carboly Department's recommendations for average work in cutting steel, nonferrous and nonmetallics respectively. Recommended speeds also are included in the tables.

If you have no experience with cemented carbide tools, the best grade to start off with in machining cast iron is grade 44A. It is a grade that combines great toughness with good resistance to wear, making it a good general-purpose tool for all types of



Here is one job that is rough on tools—using a horizontal boring machine to bore this huge 3850-pound gray iron locomotive cylinder casting. Sand inclusions and generally rough surface made this more of an interrupted cutting job rather than a continuous one. Carbobloy grade 55A carbide handled the job with no effort.

machining, including interrupted cuts.

But if you have already begun to find your way around with cemented carbide tools, a grade like 883 would come closer to meeting your needs on general machining jobs calling for close limits. This grade, for example, is normally used for cast iron and nonferrous materials. But in some cases, it can be used in machining steel. One user resorted to 883 in machining B-1113, a free-machining steel, where the specifications called for a flat face—within a total of 0.0005 in. The job was handled on an automatic screw machine with a facing tool from a cross slide in the fourth position. In this instance, the user with his know-how of carbides was able to take advantage of the characteristics of this particular grade. Grade 883 provides high resistance to

wear and is fairly tough for production machining. Although not as shock resistant as 44A, it can be used for roughing and finishing operations, and also operations requiring one-cut finishing.

A grade like 905, on the other hand, is not as tough or shock resistant as 883, but is more resistant to wear. It makes a better tool for long finishing cuts where close tolerances are required, maintaining a good cutting edge for long periods.

Currently, this grade is being used successfully on such varied production jobs as automotive cylinder boring, piston grooving, tractor track roller boring, clutch plate facing, camshaft bearing turning, etc. In precision boring

Table 2. Carboly Recommendations for Nonferrous and Nonmetallics. Average Work.

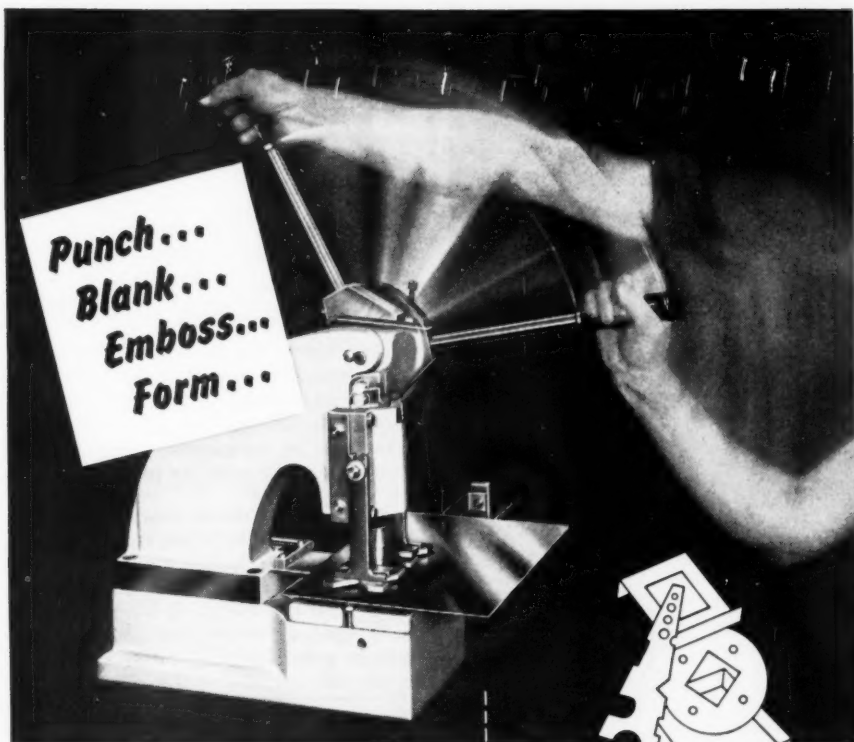
MATERIAL TO BE CUT		POWER CONSTANT	$\frac{1}{16}"$ to $\frac{1}{8}"$ Cut 020" to 030" Feed		$\frac{1}{8}"$ to $\frac{1}{4}"$ Cut 015" to 025" Feed		$\frac{1}{4}"$ to $\frac{1}{2}"$ Cut 010" to 020" Feed		$\frac{1}{2}"$ to $\frac{3}{4}"$ Cut 008" to 012" Feed		.005" to $\frac{1}{4}"$ Cut .012" to .008" Feed	
			Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade	Speed F.P.M.	Carbide Grade
BRASS AND BRONZE	Hard	10	100-250 175	44A	125-275 200	44A 883	150-350 250	883	200-400 300	883 905	300-600 400	883 905
	Soft	4	150-300 225	44A	175-325 250	44A 883	200-400 300	883	300-500 400	883 905	350-1000 500	883 905
ALUMINUM	Castings	3	175-325 250	44A	200-500 300	44A 883	250-600 350	883 905	300-1000 450	883 905	400-1500 600	883 905
	Bar Stock	4	150-300 225	44A	200-500 275	44A 883	250-600 325	883 905	300-1000 400	883 905	400-1500 500	883 905
ZINC ALLOY	Die Castings	3	.... ....	.... ....	200-500 300	44A 883	250-500 350	883 905	300-600 450	883 905	400-1000 600	883 905
	Hard		.... ....	.... ....	250-450 350	883	300-500 400	883 905	350-600 475	883 905	400-800 600	905 999
RUBBER	Soft		.... ....	.... ....	300-600 450	883	400-800 550	883 905	500-1000 650	883 905	600-1200 800	905 999
COPPER		4	100-300 200	44A 883	150-350 250	44A 883	200-500 350	883 905	300-600 450	883 905	400-1000 600	883 905
COMMUTATORS		4	.... ....	.... ....	.... ....	.... ....	.... ....	.... ....	100-300 200	44A 883	200-600 300	883
FIBRE			.... ....	.... ....	200-400 300	44A 883	300-500 400	883 905	300-800 500	883 905	350-1000 600	883 905
PLASTICS			.... ....	.... ....	250-500 350	44A 883	300-800 450	883 905	400-1000 600	883 905	500-1500 800	883 905
MONEL METAL		12	.... ....	.... ....	175-275 225	78B 44A	200-275 250	78B 907	200-300 250	78B 78	225-325 275	78B 78

Grade, in bold type, provides wide margin of safety on average work with good results. That in light type can be used when desiring specific improvements in tool performance. Speed, in dark type, can be adjusted up or down to meet specific job requirements within ranges shown in light type.

back bearing holes for crankshafts in alloy cast iron cylinder blocks, for example, grade 905 is used to finish some 2000 pieces per grind—twice the number previously considered satisfactory. The grade is an excellent performer when it comes to light finishing cuts on alloy cast iron with hardness up to 550 Brinell. However, if your requirements call for precision machining on abrasive centrifugally cast iron and other alloy irons, your best bet would be grade 999 which provides higher resistance to wear than 905.

Going to the other extreme, involving heavy duty interrupted cuts and slow machine speeds and feeds, grade 55A would do the best job on steel and cast

iron parts. This particular tool grade carbide provides low wear resistance but great shock resistance. One prominent railroad repair shop, for example, uses such a grade in boring a 3850-pound cast iron locomotive cylinder casting on a horizontal boring machine. The casting is a machining task far from ideal. Its surfaces are rough and include a good many sand pockets. Thus the tools, four are mounted on the machine head in this case, are placed in a position of actually making interrupted cuts rather than a continuous one on the inside diameters of the cylinder bores. The carbide cutting tools do the job in one nonstop operation requiring no sharpening for



Quickly, Easily, Accurately with a DI-ACRO* PUNCH PRESS

Deep throats—6 and 12 inches—of Di-Acro Punch Presses make them ideal for many operations that cannot be performed on most bench type presses.

Holes of various shapes and sizes—as large as 4" in diameter in 16 gauge steel—can be punched. Rated capacity, four tons. A variety of readily interchangeable punch and die sets are offered in round, square, notcher, rectangular and oval shapes.



LIKE MORE INFORMATION?

Send for 32-Page Catalog. Gives full details on both hand and power operated Di-Acro Punch Presses, Benders, Brakes, Notchers, Rod Parters, Rollers and Shears.

O'NEIL-IRWIN MANUFACTURING CO.
314 8TH AVENUE, LAKE CITY, MINN.

DI-ACRO* POWER PUNCH PRESS

Di-Acro Power Punch Presses are designed for high speed production. Rated capacity, five tons. 180 strokes per minute. Motor driven flywheel, other moving parts housed in welded steel cabinet.

*pronounced
DIE-ACK-RO



di-acro
PRECISION
METALWORKING
MACHINES

Creators of
"Die-less
Duplicating"



It does happen. Some engineering materials tend to crater and abrade the tool simultaneously. This is a good example. Grades of Carbide carbides, however, can be obtained to counteract this dual action.

days. The fact that some half-dozen high speed steel tools were previously required to do the same job—often breaking off at the start of the cut or soon thereafter—illustrates their toughness.

Grade to select for use in heavy duty, interrupted cuts on steel parts machining on large heavy duty machines such as 9 to 12-foot boring mills and 36 to 48-inch lathes, is 78C. Advantage of this tool is its high shock resistance rather than resistance to wear.

The carbide tool generally recommended for machining monel metal and nickel steels is 78B. It provides a medium, high-shock resistance and about medium wear resistance. This particular carbide grade, like 44A for cast iron, is a good one to select by a

user without too much experience with cemented carbides, yet seeking a good all-around tool for general purpose machining. It can be used on practically all types of steels, can take a lot of punishment while dishing out plenty of production.

One user, for instance, uses 78B to cut down a shaft turning job by some 52 minutes, reducing the diameter of the shaft a full inch with one pass in 116 minutes. The shaft was turned from a 5-inch diameter SAE 1035 steel billet. Speed and feed of this roughing pass was 307 sfm at 0.015-inch feed. Although this speed is in excess of normal carbide practice, it does indicate what can be done with carbides when handling tasks such as this.

Another company uses the same grade to cut 60 to 80 carbon steel, heat treated to 275 to 290 Brinell, making cuts at 180 to 203 sfm. High speed steel tools used for the work formerly could only operate at 60 sfm, and they required regrinding 10 times more fre-





NEW

BRYANT PORTABLE GROOVE GAGE

an extremely fast, accurate gage for statistical quality control!

Bryant proudly introduces the latest development of Bryant research — a new, portable groove gage that offers a truly accurate means of checking the diameter and roundness of internal grooves.

This adjustable gage covers a range of groove diameters up to 5", and will check grooves which are located to a depth up to 1" or 2" from a face, depending on the diameter of the groove.

Actual checking of the groove is done by a pair of segments mounted on platforms, one of which is movable. A thumb lever collapses the movable, spring loaded segment so that the gaging members may enter the work. Release of the lever permits the segment caps to expand into the groove. The movable segment actuates a precision dial indicator which shows variation from basic size. An indication of groove roundness is obtained by rotating the work part on the segments, or by rotating the gage in the work.

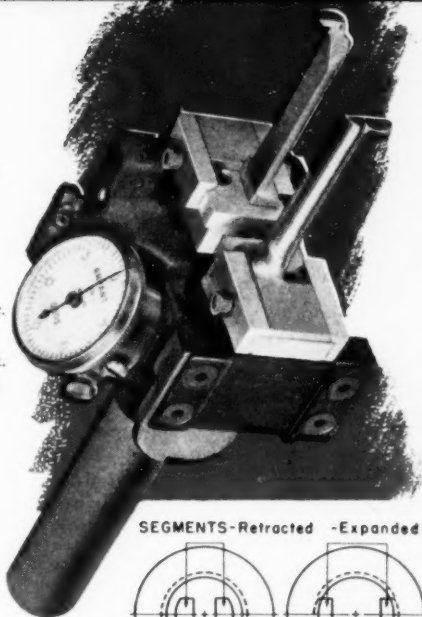
OTHER IMPORTANT FEATURES: —

- Four pairs of segments cover standard "O" ring grooves from $\frac{1}{8}$ " to $4\frac{1}{2}$ " dia.
- Four pairs of segments cover standard soap ring grooves from $\frac{1}{4}$ " to $5\frac{1}{4}$ " dia.
- A single pair of segments may be adjusted over a two inch range, making them applicable to many non-standard grooves.
- Gage gives direct reading of variation of groove diameter from basic size.
- Gage has no slides or pivots.
- Weighs only 18 ounces.

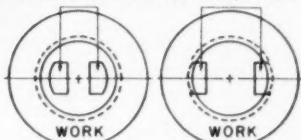
BRYANT CHUCKING GRINDER COMPANY, Springfield, Vermont, U.S.A.

*Internal Grinders • Internal & External Thread Gages
Granite Surface Plates • Boring Machines*

Send coupon today for free descriptive literature



SEGMENTS—Retracted —Expanded



Bryant Chucking Grinder Co.
Springfield, Vermont
Gentlemen: Please send information on the new
Bryant Groove Gage.

MTB

NAME.....
TITLE.....
COMPANY.....
STREET.....
CITY.....ZONE.....STATE.....

KIPP
Air Grinders



- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

MODEL JA
50,000 R.P.M.
Weight 12 ounces; length 6 3/4 inches; chuck size 1/8 inch. Wheel guard removed for better illustration.

\$42
IN U.S.A.

THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

quently than this particular carbide grade.

The carbide tool referred to as grade 78 is more suitable for finishing and light roughing work on the same range of steels handled by 78B. It is a medium shock and medium high wear-resistant carbide.

For precision finishing steels where close tolerances are held, the carbide cutting tool to use is 831. It resists wear better than 78, but is not as shock resistant.

The thing to remember when changing from one grade of carbide to another is—make the change one grade at a time. That is, use the grade next in toughness, or next in abrasive resistance to the one you have been using. As yet, there is no one cutting tool material that is highly efficient in cutting all engineering materials. Until such a cutting tool material is developed, it is necessary to have different grades of cemented carbide that best meet existing machining conditions.

Thus far, carbide tools have tackled many jobs ranging from practically "hogging" out the metal to producing fine mirror finishes to extremely close tolerances. They are a big factor in mass production or job shop operations, actually cutting machining costs in half wherever they are employed.

The End.

JIG BORING

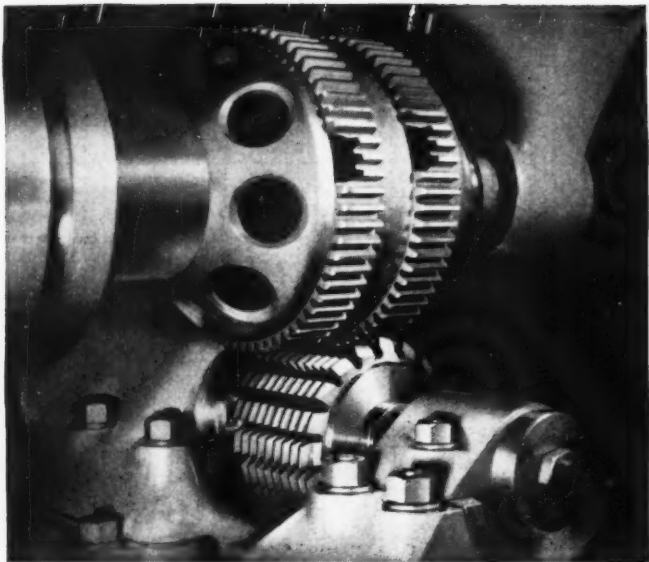
Done to your specifications

**We Have
12 Jig Borers
Including the largest
Pratt & Whitney Made**

BLOOMFIELD TOOL CORPORATION
36 Farrand St. Bloomfield, N.J.

Designations of Various Grades of Carbides Produced by American Manufacturers.

APPLICATION	Designation	Adams	Carbide	Cermat	Firthite	Konametal	Talide	Vacclay Brazor	Wetson	Wiley
CHIP REMOVAL										
Roughing cuts - cast iron and non-ferrous materials	C-1	B	44A	CA3	H	K6	C89	2A58	G5	E8
General Purpose - cast iron and non-ferrous materials	C-2	A	883	CA4	HA	K6	C91	2A5	G1	E6
Light finishing - cast iron and non-ferrous materials	C-3	AA	905	CA7	HE	K8	C93	2A7	GA	E5
Precision boring - cast iron and non-ferrous materials	C-4	AA	999	CA8	HF	K8	C93	2A7	GF	E3
CAST IRON, NONFERROUS AND NONMETALLIC MATERIALS										
Roughing cuts - steel	C-5	DD	78C 788	CA5, CA5T	T-04	K25, KM	S88	EE	WS	945
General purpose-steel	C-6	D	78 788	CA1	TA	K25	S90	EM	WM	710
Finishing cuts - steel	C-7	C	78	CA2	T-19, T-16	K3H	S92	E	WH	606
Precision Boring-steel	C-8	CC	831	CA6	T-31	K5H	S92	EH	WH	509
STEEL AND STEEL ALLOYS										
WEAR APPLICATION										
Wear Surface - No Shock	C-9	A	44A 883	CA4	HA	K8	C89	2A5	G1	E6
Wear Surface - Light Shock	C-10	B	779 44A	CA3	H	K6	C88	2A68	G5	E8
Wear Surface - Heavy Shock	C-11	HD-20	558 55A	CA10	HC	K1	C8515	2A3	M	E18
IMPACT APPLICATIONS										
Impact - Light	C-12	BB	44A 55A	CA10	DC-2	K1	C8515	2A3	G5	E13
Impact - Medium	C-13	HD-20	558 55A	CA11	DCX	K18	C8020	AX	M	E18
Impact - Heavy	C-14	HD-25	190	CA20	DC-3	K25	C7525	AY	M	E25



Hold .002" Over Pins, One-Cut Hobbing ON NO. 14-15 MACHINE

Where heavy production and extreme accuracy are required, the No. 14-15 Hobbing Machine offers wide work range with extremely easy set-up and operation. Automatic cycling with infinite hydraulic feeds assures consistently high output.

On the job shown here, Caterpillar Tractor Co. is finish hobbing 8 pitch, 10" diameter clutch gears in 1-cut on a Barber-Colman No. 14-15 Hobbing Machine. Measurement over .250" pins is held consistently within .002."

An important production feature of the machine is the built-in differential, standard equipment for convenience in hobbing helical gears. A large 18 $\frac{3}{4}$ " diameter worm gear running in anti-friction bearings also permits high speed precision indexing.

With capacity for one-cut hobbing of gears as coarse as 3 $\frac{1}{2}$ pitch in steel, the No. 14-15 supplies rigidity and power to meet most any demands for high gear production and accuracy.

B U I L D E R S O F P R E C I S I O N G E A R

wide variety of work on no. 14-15 machines

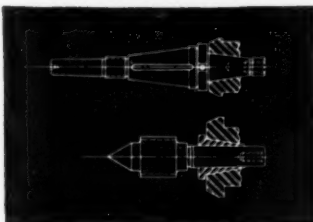
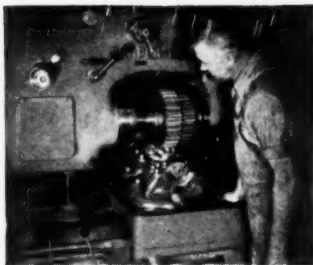
In addition to these 8 pitch gears, a variety of high production gear jobs are handled on No. 14-15 machines in the manufacturing department at Caterpillar. The accuracy, versatility and production convenience of the machine make it ideal for heavy accurate gear cutting, typical of tractor production. Shown here is another job, a 3 pitch cluster gear with 10.333" outside diameter, hobbled in two cuts to pre-shave limits, one per load, holding .006" over .5760" pins.

interchangeable hob spindle adds flexibility

The No. 14-15 has an interchangeable shank-type hob spindle as standard equipment. This enables the operator to interchange straight arbor, taper arbor or shank-type hobs to suit a variety of job conditions. Different diameter arbors may also be used. In cases where hob diameters are small and a shank hob is required, shanks may be inserted directly into the spindle.

hydraulic pressure available for tool clamping

Since the machine is an all-hydraulic machine, self-contained hydraulically actuated tooling for work holding is easily adapted. Hydraulically operated collets and chucks may be used as optional equipment when the machine is ordered with a hydraulic cylinder. Use of such equipment greatly reduces handling and loading time, and is particularly convenient where one operator is handling several machines. The hydraulic system of the machine has been constructed in such a way that this cylinder may be ordered and piped in after the machine has been in service.



Complete information on the No. 14-15 Hobbing Machine is available from your Barber-Colman representative; or send us part prints and production requirements, and we will gladly furnish estimates without obligation.

Write Us for a Copy of the New No. 14-15 Hobbing Machine Bulletin.

HOBBS • CUTTERS • REAMERS
HOBGING MACHINES
HOB SHARPENING MACHINES



Barber-Colman Company

GENERAL OFFICES AND PLANT,

6411 BOON STREET, BOONFORD, ILLINOIS

H O B S A N D M A C H I N E S S I N C E 1 9 1 1

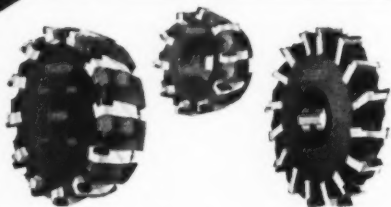
MCCROSKY

**COST
CUTTING
TOOLS**

Jack-Lock[®] **MILLING CUTTERS**

**Face Mills, Shank and
Shell End Mills, Half Side
and Staggered Tooth Designs**

Standard Sizes from 3" to 24" in Diameter



Carbide Tipped or High Speed Blades for Cast Iron, Steel and Aluminum

Engineered to match the ruggedness and power of modern machines, McCrosky Jack-Lock[®] Milling Cutters will give you a maximum of highly efficient service.

McCrosky's Jack-Lock[®] wedges hold the blades rigidly and solidly in the body; yet permit easy release of the blades; and relocking again, rigidly and

solidly, without hammering or pounding.

Fine pitch adjusting screws permit the blades to be advanced accurately against an indicator, reducing to a minimum the amount of blade stock lost in regrinding; and minimizing purchases of new blades.

Sizes and designs for every requirement. Write for Bulletin No. 17-M.

MCCROSKY Universal MILLING CUTTERS

Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.



MCCROSKY Wizard[®] QUICK-CHANGE CHUCKS

McCrosky's Wizard Quick-Change Chuck and Collet outfits hold tools centered and rigid. They enable the operator to change tools without stopping or slowing down the spindle. Write for Bulletin 18-B today.



MCCROSKY Super[®] Adjustable REAMERS

Chucking reamers with straight or tapered shanks, also shell reamers with tapered holes or large straight holes. Standard sizes from 1/8" to 6" in diameter. Write for Bulletin 18-R today.



MCCROSKY Turret TOOL POSTS

These tool posts permit tools to be swung into position quickly, indexed accurately, and locked rigidly. Four styles—11 sizes. Write for Bul. 18-T.



MCCROSKY Block Type BORING BARS

Individually ground, tapered V-key centers the block and cutting blades accurately and rigidly yet permits easy release for regrinding. Write for Bul. 18-B.



MCCROSKY Multiple Operation TOOLS

McCrosky "Specials" combine two or more boring, facing, chamfering or reaming operations into a single tool, cutting set-up time and costs. Write for Bulletin 17-S today.



MCCROSKY

**TOOL
CORPORATION**
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

Waldes Truarc Internal Grooving Tool

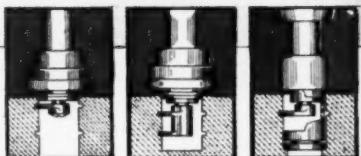
for precision cutting of internal grooves
in bores and housings

FAST! ECONOMICAL! NEEDS NO SKILLED LABOR!



Internal groove-cutting becomes the simplest of operations with Waldes Truarc Internal Grooving Tool. Easy to adjust—easy to operate...readily adaptable to individual requirements.

Designed for use in any hand drill or automatic drill press and screw machine... assures a concentric recess without injury to metal. Operates by fingertip pressure—especially suitable for unskilled operators.




Groove
located from
top of hole

Double groove
located from
top of hole

Groove located
from bottom
of hole

The Waldes Truarc Grooving Tool when used in an electric or pneumatic hand drill, can be taken to the job eliminating disassembly and excessive handling...resulting in all-around savings in time and costs!

Write now for descriptive brochure giving mechanical details,
cutting sizes...extra features


WALDES
TRUARC
Reg. U.S. Pat. Off.
GROOVING TOOL

WALDES KOHINOOR, INC., 47-16 Austel Place, Long Island City 1, N.Y.

Waldes Truarc Grooving Tool
Manufactured under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, New York MT115

Please send me your descriptive brochure on
Waldes Truarc Internal Grooving Tool.

Name

Title

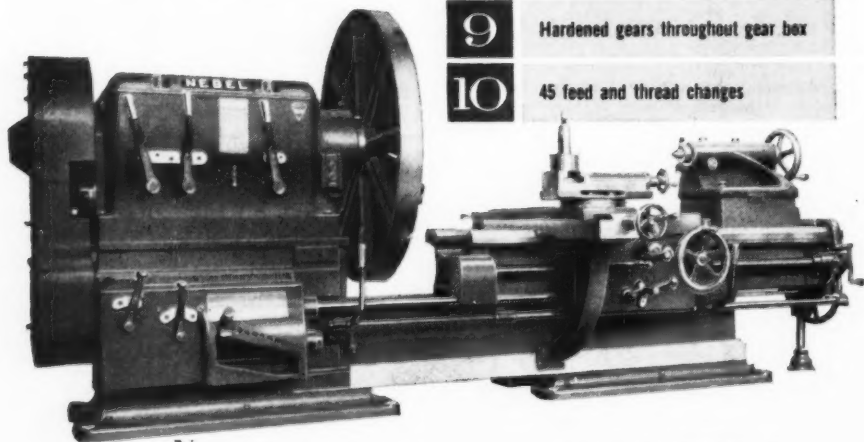
Company

Business Address

City Zone State

10

big reasons why
Nebel is
your best buy
in gap lathes!



Nebel extension bed gap lathes are so useful, accurate, easy to operate and so economical . . . that they have won themselves a prominent place in the metalworking industry. With their flexible swing and center distance capacity they can do the work of two ordinary lathes. Made in

- | | |
|----|---|
| 1 | Gap open . . . it's a gap lathe! |
| 2 | Gap closed . . . it's an engine lathe! |
| 3 | Timken equipped headstock |
| 4 | Shaved and hardened headstock gears |
| 5 | Heavy tailstock easily moved with crank |
| 6 | Electric power moves sliding upper bed |
| 7 | Hardened gears throughout apron |
| 8 | 2-station spindle control |
| 9 | Hardened gears throughout gear box |
| 10 | 45 feed and thread changes |

two sizes: 20"/40" and 28"/50". Why not send for descriptive bulletins today?

Nebel
THE NEBEL MACHINE TOOL CO., CINCINNATI 25, OHIO, U.S.A.
WORKHORSE OF THE METAL WORKING SHOP SINCE 1899

THE NEBEL MACHINE TOOL CO., CINCINNATI 25, OHIO, U.S.A.

Safety Plan For Pneumatic Chucks

By James Joseph

MACHINE SHOPS have always had "danger points"—but one which is seldom recognized is the pneumatic chuck. This doesn't mean that air-actuated chucks are in themselves dangerous. They're not. But did you ever stop to consider what would happen should the air pressure holding these chuck jaws suddenly fail?

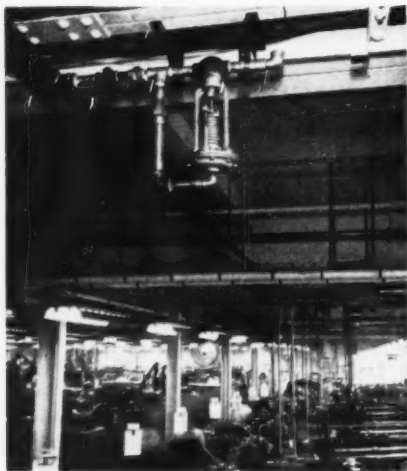
Well, Hydro-Aire Inc's plant engi-

neer, Martin Vukich, recently had occasion to speculate the danger. He was called out on an emergency at the Burbank, Calif., plant—the main compressor was acting erratic.

While fiddling with the compressor a power shortage suddenly hit the plant—knocking the compressor and some associated equipment out, but leaving the metal-working machines, with

All pneumatic chucks in Hydro-Aire's shop are safety-monitored by whistle warning.





Valve-diaphragm tied into main plant's air line. If air falls to a dangerous level, warning whistle automatically sounds.

pneumatic chucks, in operation.

Plant engineer Vukich, like many another machine shop maintenance man, had never really considered the danger inherent in pneumatic chucks—should the compressor go out or its air tanks bleed off.

But the thought of those fast-spinning chuck jaws letting go, as air pressure fell below the 60 p.s.i. operating level, sent him into the shop. There he turned off the machines and breathed easier. But at the same time he got the idea of rigging an all-stop warning—that would sound a whistle should air pressure drop below 75 p.s.i. This level, he figured, should still give ample time—probably a minimum five minutes of warning even with a full call for air from various plant machines.

Such a safety device might at first glance seem unnecessary, since each pneumatic chuck usually has a near-at-hand pressure gauge. But how often do machinists gander that gauge? The answer: only occasionally. And "occasion-

ally" might be too late. If chuck jaws let go, metal would fly all over the shop and somebody was sure to get hurt.

So Vukich came up with a bright idea.

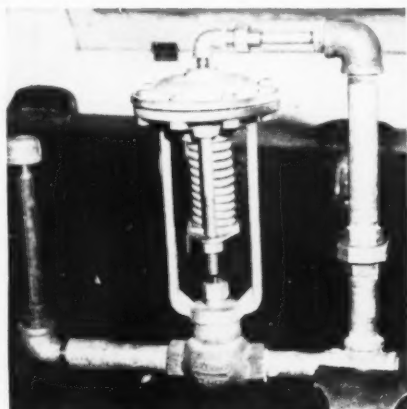
He has rigged a diaphragm valve in parallel with the plant's 4-inch air header—installed where the header branches off into smaller lines leading to individual air-actuated chucks. Thus the valve monitors the entire compressed air system.

The diaphragm, actually a reduced pressure valve, is rigged with a warning whistle. It sounds off when pressure falls to 75 p.s.i. or below.

In operation, the valve-diaphragm unit is mounted with a 1-inch receiver-accumulator line reducing to a 1/4-inch line which pressures the diaphragm, holding the valve closed. A 1-inch line runs from the main air header to the valve orifice, thence to the whistle.

With the usual 100-110 p.s.i. air surging the line, pressure is maintained both against the diaphragm and against the valve orifice. However, the larger area diaphragm exerts more pressure—insuring that the valve remains closed under normal operating conditions.

The diaphragm valve which actuates warning whistle.

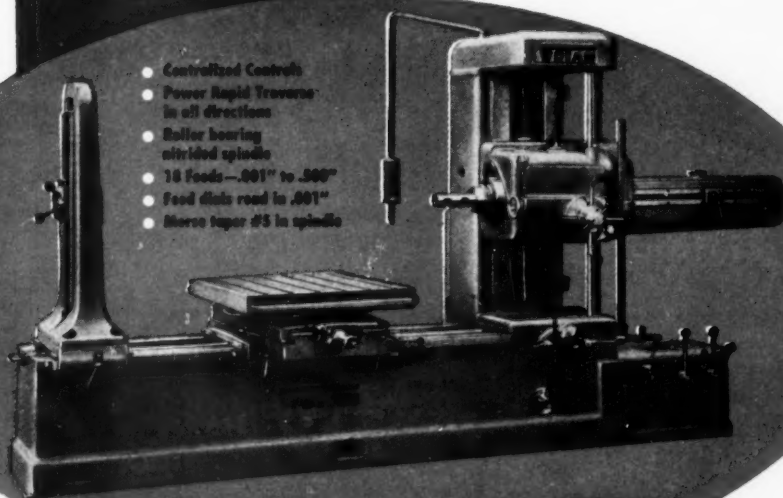


immediate delivery

**3" horizontal boring mill for
TOOL ROOM and production**

table top swivels full 360°

18 speeds—17 to 910 r.p.m.



- Controlled Controls
- Power Rapid Traverse in all directions
- Roller bearing nitrided spindle
- 18 feeds—.001" to .300"
- Feed dial read in .001"
- Morse taper #5 in spindle

3" horizontal boring mill for TOOL ROOM and production

WOTAN

over 75 years of "know-how" in the manufacture
of precision production machinery

Users of the WOTAN Boring Mill find that advanced engineering and expert craftsmanship have combined to produce an outstanding piece of tool room equipment that is also well suited to long and short production runs.

Simplicity of design permits an unusually low price.

Parker Machine Company has these Mills on hand for immediate delivery. Write or phone John Schleiffer at our Brooklyn headquarters for full information.

Parker Machine Company, Inc.

158 PIONEER ST., BROOKLYN 31, NEW YORK • TRIANGLE 5-2103 and 2157



**TOOL & CUTTER
GRINDERS**



**ENGINE
LATHES**



**HORIZ. & VERT.
MILLERS**



**VERTICAL TURRET
LATHES**



**16" AND 22"
SHAPERS**

Should the line pressure decrease to 75 p.s.i., pressure is removed from the diaphragm and air rushes through the now opened valve orifice—actuating the air whistle.


Rather than allow the whistle to continue to blow until either pressure is

again up to normal or the air tanks have bled themselves, Vukich has rigged a shut-off mechanism, hand operated, which closes the diaphragm, stilling the whistle.

You can take the risk out of unforeseen pressure failures by a similar installation. Here's one case where whistling while you work can save lives—and machinery.

The End






KING PORTABLE BRINELL

for all **HARDNESS TESTING**, Throat 4", Gap 10", Wt. 27 lbs. — **ACCURATE**

Puts actual load of 3000 KG on 10 mm. ball.

Test head removable for testing very large parts.

ANDREW KING
P. O. Box 606-H
Ardmore, Pa.



DEALERS
Write for
Our
PROPOSAL

IN SMALL & LARGE
PLANTS
Bench Type
"MILLERS"

BARKER



Exclusive 3-Way Travel

WRITE FOR LITERATURE

are performing countless close tolerance machining operations on big run jobs. You can easily effect a 50% economy in the milling costs of small parts.

We have hundreds of customers whose repeat orders signify satisfaction. Get all the facts on this versatile "miller."

PRODUCTION MODEL



Straddle milling using our standard stub arbor.



BARKER 3 1/4"
Graduated Swivel Base

Vise



Slotting with our standard stub arbor.

BARKER ENGINEERING COMPANY

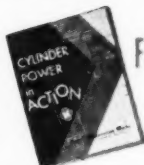
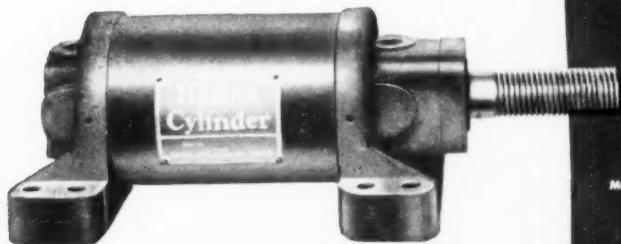
500 GREEN ROAD
CLEVELAND 21, OHIO



...here's how you can use
HANNA *Fluid Power* **Cylinders**
 in your machine tools and
 equipment

IF YOU HAVE A PUSH, PULL, LIFT, PRESS, CLAMP OR CONTROL PROBLEM, Hanna Fluid Power Cylinders can be the answer. The mechanical movements shown here may suggest ways you can simplify the actuation and control of machines and equipment to replace or reduce manpower.

In the majority of cases, you can select a standard cylinder model to meet your specific requirements from the broad Hanna Hydraulic and Pneumatic lines.



FREE! "27 Ways to Use Cylinder Power"

Write for the New "Cylinder Power in Action" Bulletin

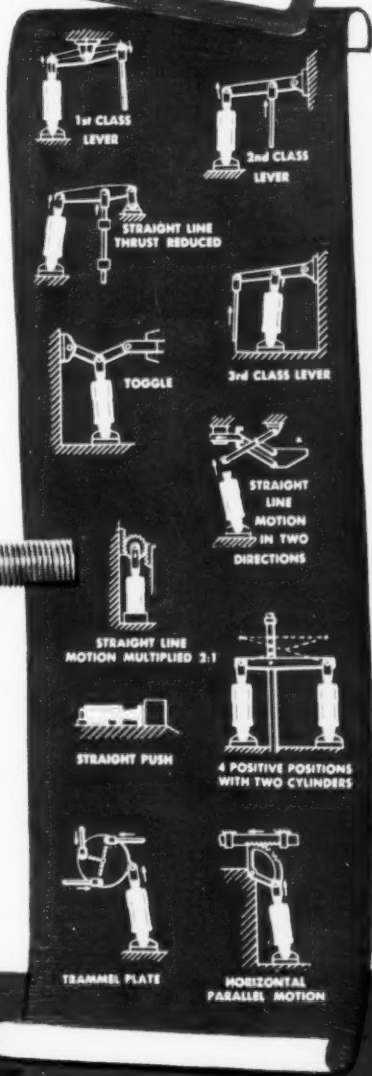
Bulletin 255 shows you 27 ways you can put cylinder power to work for you. 15 diagrams and 21 actual application photographs show how Hanna Fluid Power Cylinders can be used to simplify and speed up power motion problems. Write for your free copy today!



Hanna Engineering Works

1734 Elston Avenue • Chicago 22, Illinois

HYDRAULIC AND PNEUMATIC EQUIPMENT • CYLINDERS • VALVES • TUBING





Let your operator
tell you . . .



... why REID GRINDERS are the easiest to operate!

... A competent operator knows a competent machine when he sees—and operates one. Reid's 50 years of experience in building grinders produce a *co-ordinated* design for greater efficiency of precise operation. That's why REID is the operator's preference throughout industry.

Write for latest illustrated bulletin (618-6) with specifications of power and hand feed Reid Precision Surface grinders.

Reid Brothers



Company, Inc.

BEVERLY, MASSACHUSETTS

... Turn a good man loose with a Reid precision grinder for five minutes. The first thing he'll tell you is that a Reid grinder is the *easiest* to operate. Ask him why, and he'll point out these features:

1.



Minimum vibration

One piece column casting mounted on base

2.

Effortless control

All hand-wheels are at finger-tip level



3.

Visible, protected electric controls

—mounted in base; protected by shatter-proof transparent plastic



4.

More dust protection

Telescoping dust plates; adjustable dust guard spout



5.

Easily adjustable table reverse dogs



6.

New design hinged wheel guard

—for easier wheel change





THE Hallmark of

Precision Gage Blocks

Now Offers...

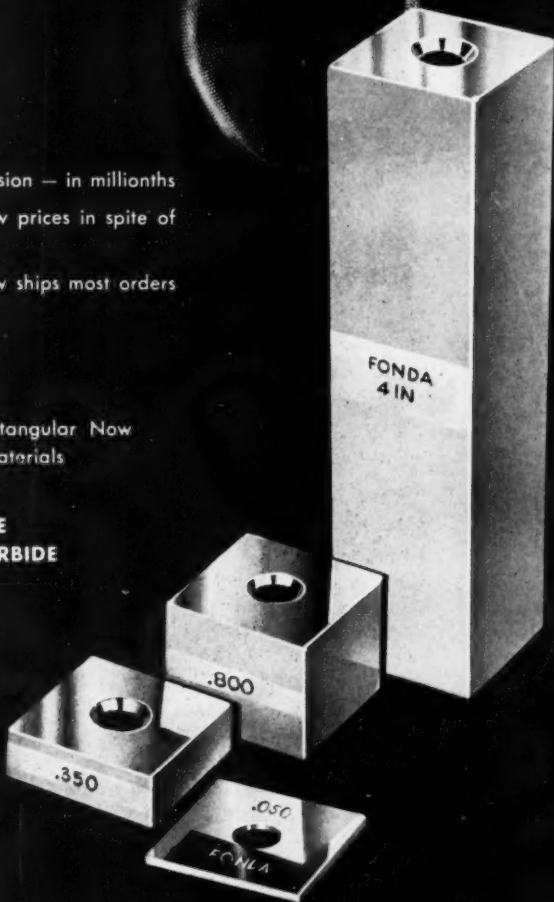
QUALITY . . . Lasting precision — in millionths

PRICE . . . Traditionally low prices in spite of rising costs

DELIVERY . . . FONDA now ships most orders direct from stock.

Both Square and Rectangular Now
in all Three Materials

STEEL
CARBIDE
CHROME CARBIDE



FONDA GAGE SALES CORP.

38 Broad Street, Port Chester 1, N. Y.

Send for full information. Just attach
this coupon to your business letterhead.

Please send me your descriptive brochure,
"Precision In Millionths"

NAME _____ TITLE _____

COMPANY _____

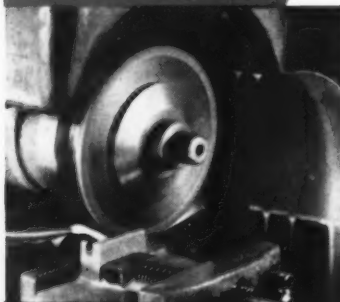
BUSINESS ADDRESS _____

CITY _____ ZONE _____ STATE _____

In 59 Seconds

**THE NEW
JETALINE
DIAMOND
WHEEL**

**Will Plunge Cut In A
Single Pass A $\frac{1}{8}$ " Slot
In A Carbide Blank
1" Long**



Plunge Cut did not overheat

Type B&WHC, Type D1T, and Type D11T, Jetaline
Diamond Grinding Wheels

IMPORTANT

Because the Jetaline alloy is non-loading and non-glazing, you can save by using smaller diamond wheels of ordinary diamond concentrations.

At a new low cost you can now grind carbide tools and get the finest micron finish that only a diamond wheel can give. Cutting chipbreakers in a single pass instead of in passes of .0005" to .001" at a time means carbide tools now *cost less to service and maintain in your own plant*. The newly developed alloy bond in the all-purpose Jetaline wheel is non-glazing . . . non-loading . . . does not require redressing. When used with a coolant Jetaline will not burn, chip or round the corners of a carbide cutting edge. Factory tests show a Jetaline wheel has at least 7 times the life of a resinous wheel—it also has longer life than any other metal or vitreous bond wheel. In spite of these advantages a Jetaline wheel costs no more than other types of diamond wheels.

Send for folder describing all the advantages the new Jetaline diamond wheel offers to you.



ACTION DIAMOND TOOL CO.
4548 W. GRAND AVE. • CHICAGO 29, ILL.

Automatic Welding Cuts Costs of Fan and Blower Elements

FABRICATION of pressure blowers, axial flow fans, centrifugal compressors, mechanical draft fans and industrial exhausters demands maximum strength and rigidity of structure without excessive weight, in addition to air tightness and perfect balance of rotor elements. Long experience has proved that arc welded steel can meet these qualifications and also can facilitate a high degree of design flexibility to meet the needs of specific installations.

For 76 years, Buffalo Forge Company, Buffalo, New York, has been building this type of equipment, and for nearly two decades welding, in one form or another, has been a principal fabricating technique. More recently, progressive advances in welding methods and equipment, such as fully automatic machines and the hidden arc system of welding, have brought further plus values.

Fans and blowers are designed in scores of sizes and types, many completely special in character, such as large

"sintering" fans to carry off dust on steel mill ore sintering machines. Basic material of construction is mild steel plate, although substantial quantities of alloy steel, stainless steel and aluminum find their way into various components. Each calls for special assessment of welding characteristics and evaluation of the best welding method to use.

Welding is adapted not only to the joining of rotor and housing parts, but also to provide wear resistance on rotors where fly ash or other abrasive dusts are being handled. Wear strips and raised welding beads are applied to blades to extend their life; and while they cannot give complete protection, they do provide a large measure of improvement.

It might be thought that a manually welded rotor for a blower or a fan assembly, often comprising hundreds of individual pieces, would be a difficult thing to balance. Some of them operate at extremely high speed and require both static and dynamic bal-

ancing. Practice has shown that careful welding techniques and training of operators can produce rotors capable of being balanced readily with practically no machining necessary.

A complete review of the manufacturing procedures involved for all this equipment would be difficult to compile because of the wide variation in designs handled and the multitude of operations. Hence, a representative selection will be presented herewith, along with illustrations with emphasis on innovations in welding.

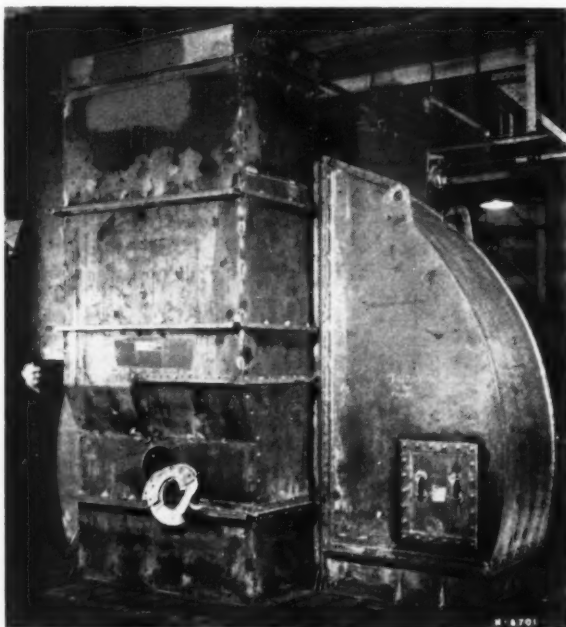
Reference to figure 1 shows one of the large sintering fans previously mentioned. Three of these have been built for steel mill installations. An idea of the size can be gained by noting the height of the man standing at the extreme left. Curved section of the housing is welded from 1 inch mild

steel plate, with square butt welded joints, as shown close-up in figure 2, one pass on each side. Equipment for this operation is a Lincoln LAF-2 fully automatic welding machine. Penetration of the weld must be 100 percent through the joint.

Inlet boxes of the fan assembly are of $\frac{3}{8}$ inch plate. It will be noted there are a number of corner "skip" welds on these sections. These are made manually, the $\frac{1}{4}$ " diameter electrode being a new special E-6012 electrode for high production fillet welding.

An interesting method of eliminating the tendency of certain joints to crack was perfected. Faces of the butting plates are prick punched before assembly, resulting in a small gap in the joint prior to welding. This allows shrinkage to take place without over-stressing the weld metal during cooling.

1. Typical of large industrial units is this sintering fan. Curved sections are automatically welded from 1 inch plate inlet boxes manually welded from $\frac{3}{8}$ inch plate.



**FRAY VERSATILITY
MOVES WORK FASTER!**

FRAY

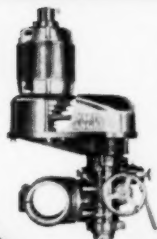
NO. 10RH

UNIVERSAL RAM • TURRET TYPE •
VERTICAL & HORIZONTAL

MILLING MACHINE

Speed up production by cutting job transfers with the versatile Fray 10-RH. This all-purpose milling machine performs an unequalled range of operations, cuts idle machine time and produces more work per man hour. It machines at any angle—vertical, horizontal or both. It mills, drills or bores at any angle. On any single piece of precision work requiring a variety of operations it is easier to reset the Fray than to transfer the work. For faster jobs, done better at less cost—investigate the easy to operate Fray 10-RH. A High Precision Tool.

FRAY "ALL-ANGLE" HEAD TYPE 4



For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.

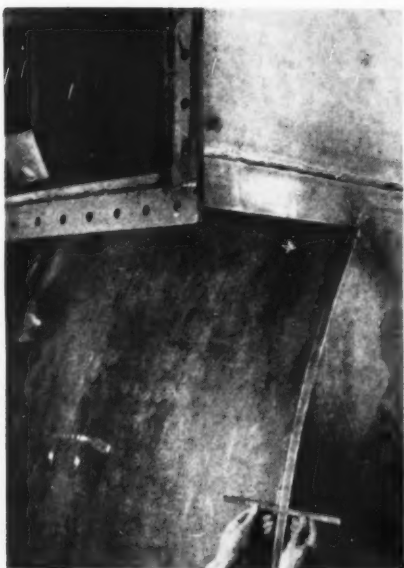
Overall Height 7'

Write for Details and Specifications
Bulletin 10



FRAY MACHINE TOOL CO.

515 WEST WINDSOR ROAD, GLENDALE 4, CALIFORNIA



2. Close-up of square butt welded joint in housing of sintering fan. One pass is made on each side to assure 100 percent penetration. Manual welds may be seen on inlet box above.

Incidentally, most of the steel sections are prestressed before welding to eliminate the possibility of distortion.

Another setup on the automatic welding machine is shown in figure 3. Here the longitudinal seam in a cylindrical 60 inch axial flow fan housing is being welded, material being $\frac{3}{8}$ inch mild steel plate. Welded from the outside only, a copper back-up bar and special clamping rails, as illustrated, assure 100 percent penetration of the weld. This is a hidden arc type of weld, with flux deposited over the arc as the head travels along the overhead

3. Fully automatic welding of seam in cylindrical 60 inch axial flow fan housing of $\frac{3}{8}$ inch plate is done by the hidden arc method. Magnetic ground connection at right.



Pick the Top "NAME BAND"

for all these
Metal-Sawing
Jobs



For Heavy Production Cutting

You'll like this rugged, break-resistant standard tooth blade for trimming gates and risers off castings, cutting metal bars and other tough production work. Hardened along the tooth edge only, it cuts fast, stays sharp, gives a longer run for your money! All standard widths and tooth spacings. Furnished in 100' and 300' coils or welded to length for specific machines.



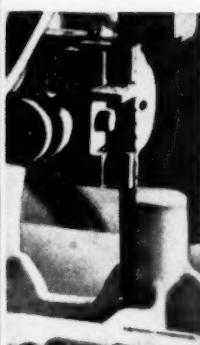
For Contour Cutting and Die Making

In the narrower widths, this edge-holding, smooth cutting blade is an outstanding favorite for contour work. Because the teeth are set with absolute evenness on both sides of the blade, you can depend on straight, on-the-line cuts with no "leading." All standard widths and tooth spacings furnished in 100' and 300' coils or welded to specified length.



For Horizontal Cut-Off Work

Furnished either Regular or Wavy Set in the wider widths, this Simonds-made standard tooth blade easily handles the wide variety of cutting required in general shop and steel warehouse operation. All sizes come in 100' and 300' coils or welded to length.



For Cutting Soft Materials

This Skip-Tooth Hard Edge Blade has extra gullet capacity with maximum blade strength . . . gives fast, trouble-free service in cutting aluminum, magnesium, plastics, plywood and hardwood. All standard sizes available in 100' and 300' coils or welded to length for specific machines.

Get Delivery From Stock From Your Industrial Supply Distributor



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon.
Canadian Factory in Montreal, Que. • Simonds Division: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada

4. Semi-automatic "Squirt" welding of smaller fan housing of 8 gage steel. Operator holds gun steady while the positioner rotates the housing under it. Cone holds flux.



rail. Electrode wire, fed from the reel, is 5/32 inch No. L-60, a mild steel analysis. Flux is a standard Lincoln No. 780 agglomerated flux.

A noteworthy feature of the setup is the use of a magnetic ground, shown at the right end of the housing. It is, of course, movable and can be positioned at the proper point to minimize arc blow.

"Squirt" welding is another variation of the hidden arc technique. A good example of its application is in figure 4 where an operator is welding the housing face of a smaller size fan. Material is 8-gage mild steel. While in many cases of this type of welding it is necessary for the operator to travel the welding gun along the joint, here he holds it stationary while the housing revolves on the table of the positioner.

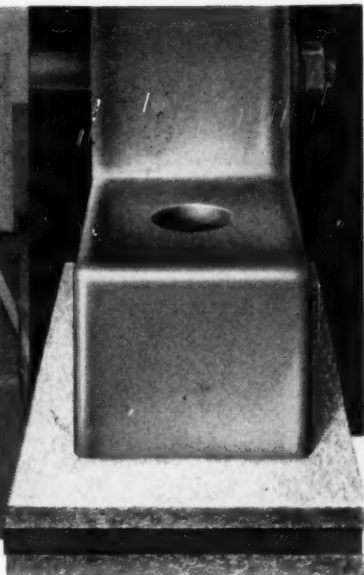
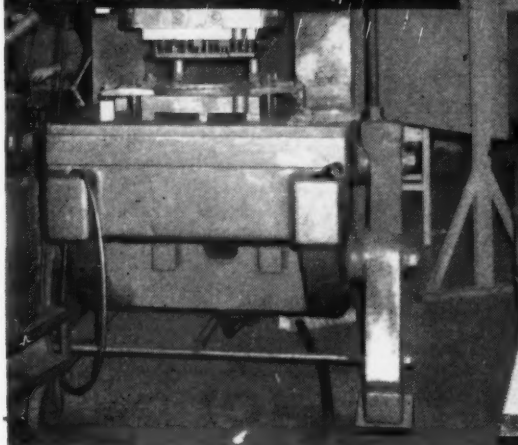
The identical arrangement is used

on a variety of other fan housings, ranging in material thickness from 10 gage to 1/4 inch plate. It is estimated that this application of semi-automatic welding has reduced welding man hours an average of 30 percent over former manual arc welding.

Dynamic balancing of fan wheels and blower rotors, some of which operate at speeds as high as 3,600 r.p.m., is done on the special equipment shown in figure 5. Location and degree of imbalance are recorded electrically and correction is made temporarily with a small piece of clay. When balance has been checked out, the clay is weighed and a small piece of steel plate of equal weight is welded at the proper point on the rotor. Static balance is also carried out on these rotors.

Welded steel blower rotors are tested at high speeds, even up to destruction, in a vacuum test pit—a steel cylinder

300-ton Minster Press in a large mid-western plant mounted on UNISORB, without bolts. There is no indication of compression or "matting down" of UNISORB, even under a large machine such as this.



**PLANT AFTER PLANT
PROVES THAT MACHINES LARGE AND SMALL
SHOULD BE MOUNTED ON**

UNISORB[®]

In addition to reducing transmitted machine noise and vibration up to 85%, UNISORB saves you time and money on installation.

You don't need bolts or lag screws with modern UNISORB machine mounting. No more holes drilled in the floors. You simply order the grade of UNISORB recommended for each machine, cement the pad to the machine base and floor, let the cement set and begin operation.

Return the coupon today for your copy of the book that shows how easy it is to use UNISORB mounting pads. The book also shows how UNISORB reduces transmitted vibration and noise by as much as 85%.

UNISORB is also available pre-coated with adhesive, for use with machines which do not require shimming.



Look for the red center and
UNISORB brand mark

The
FELTERS
Company

219 SOUTH ST., BOSTON 11, MASS.

Offices: New York, Philadelphia, Chicago,
Detroit, St. Louis

Sales Representatives: San Francisco

Mills: Johnson City, New York; Millbury, Mass.;
Jackson, Mich.; New York City

RETURN COUPON NOW! Please send a copy of your free book, "Why It Pays to Anchor Your Machines with UNISORB".

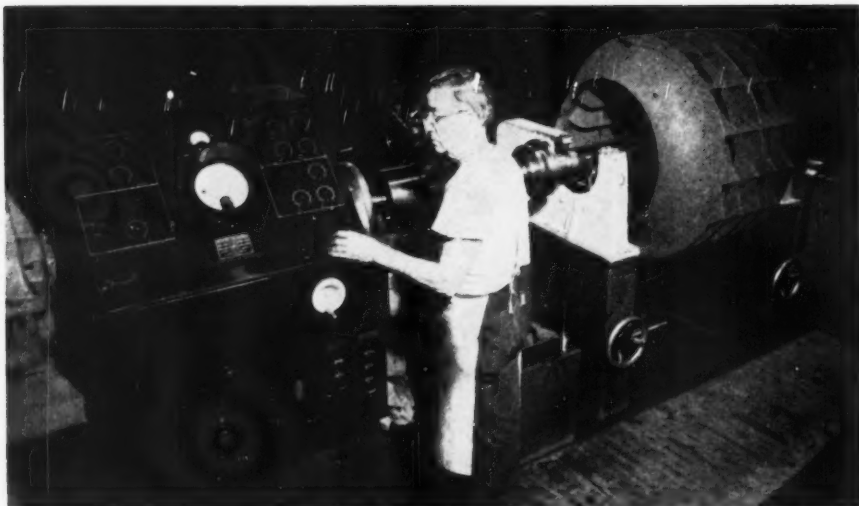
Name.....Title.....
(Please Print)

Company.....

Address.....

City.....Zone.....State.....

Return to: The Felters Co., 219 South St., Boston



5. Blower rotors, operating at speeds up to 3,600 r.p.m., require both static and dynamic balancing. This machine records dynamic unbalance, corrected by welding plate to rotor.

a NEW! Bench Model Drill Grinder
with
**EXTRA
CAPACITY**



STERLING MODEL "DB"

**Grinds $\frac{1}{8}$ " to $2\frac{1}{2}$ " Drills
without collets or chucks**

Easy to set up for any drill sizes—fast to operate—grinds accurately. Any machine operator can quickly learn to grind 2, 3 and 4 lip drills.

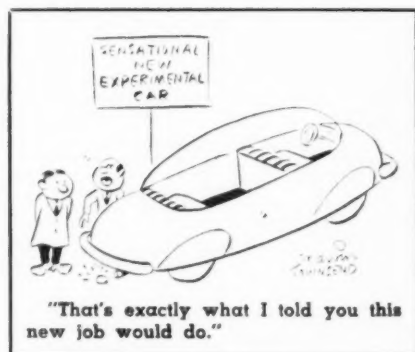
The Sterling Model "DB" is a rugged, compact bench machine built for long life.

Ask your dealer or write to:

McDONOUGH MANUFACTURING CO.
1520 Galloway Eau Claire, Wisconsin

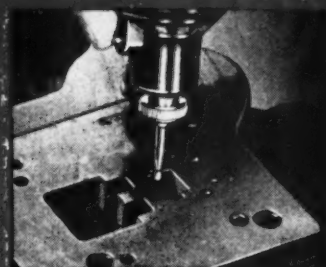
embedded in concrete and made airtight so that it can be evacuated by a pump. Spinning rotors in a vacuum require low horsepower so they can be tested up to 60,000 to 70,000 f.p.m. tip speed. Electronic equipment records rotating stresses and critical vibrations, facilitating design changes, should they be required.

The End

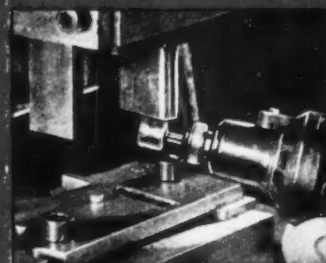




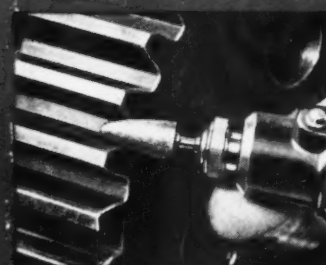
MARKING PARTS



GRINDING DIES



SHARPENING MACHINE TOOLS



GRINDING MACHINE PARTS

**NO NEED TO TEAR
DOWN SET-UPS!**

Take

DREMEL

Electric
**MOTO-
TOOL**
**TO THE
JOB**



Approx.
27,000 r.p.m.

**"THE POCKET-SIZE
MACHINE SHOP"**

Dremel Moto-Tools are time-tested—have been widely used in industry for over fifteen years. A veteran of World War II, Moto-Tool served in war plants and at military maintenance bases throughout the world. Thousands of these mighty midgits helped to make the atomic bomb—were used to establish production records in defense industries during the last war. Hundreds of toolroom and production line operations, such as polishing and grinding dies, burring parts, marking tools, sharpening cutters, touch up jobs, etc., are accomplished in seconds, **without tearing down "set-ups."** Moto-Tool is sturdily constructed for long lasting industrial service. Weighs only 13 oz.—dynamically balanced for vibration-less operation.

MOTO-TOOL KIT NO. 2
contains 23 accessories
including high-speed steel
cutters and Model 2 Moto-
Tool in sturdy steel case
.....\$25.95

MOTO-TOOL No. 2 with
one emery wheel point
.....\$17.85

Dremel **HIGH-SPEED STEEL CUT-
TERS** and balanced wheel points are
available for all makes of hand grind-
ing tools. Write for literature.



WRITE FOR INDUSTRIAL CATALOG



DREMEL MFG. CO. Dept. 213-L RACINE, WIS. U.S.A.

Quick-Action Nest Type Drill Jig

By **Tom Brown**, Consulting Tool Engineer

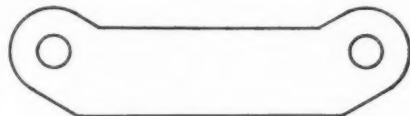
WHEN DESIGNING jigs for a high rate of productivity, it is advisable for the designer to pay attention to the methods of loading and unloading the work and not to concentrate solely upon the fastest way of performing the actual metal cutting operations. If the cutting tools will perform their functions in a few seconds, loading and unloading times which occupy minutes will be unprofitable. High speed metal cutting can be obtained at considerable expenditure on tools, but the high cost will not be justified if inefficient methods are used for placing and locating the work in the jig. It is better to try and design for well-balanced loading and cutting times so that tool expenditure can be shared out fairly evenly between loading and cutting functions.

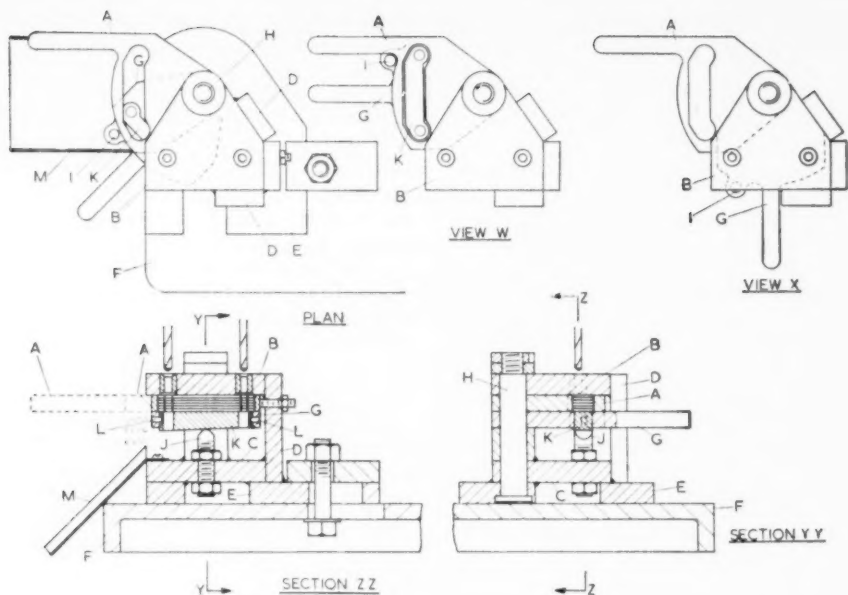
One of the cheapest and most efficient methods of locating flat shapes in drilling jigs is by means of the nest. This nest usually consists of a flat plate in which is machined an aperture whose shape conforms closely to that of the

work piece. Placing the work pieces in this aperture locates them with a fair degree of accuracy which is dependent, largely, upon the pieces being closely similar as regards size and form. If the pieces are variable in size, some will fit loosely in the nest while others which are larger may not enter the aperture at all. Generally, if the pieces have been first machined on the exterior profile, they will be sufficiently similar in size to enable the nest form of jig to be used.

Utilization of the nest form of jig is dependent to a considerable extent upon the accuracy required in placing

1. Chain saw link in 1/16 in. thick carbon steel, to be drilled 3/16 in. diameter at each end.





drilled holes therein. If tolerances are large, rough pieces such as flame-cut shapes, steel stampings and band-sawn shapes can be drilled with the nest type jig. Although loading of such a jig consists of simply dropping the component into the nest aperture, unloading usually requires that the jig be turned over bodily so that the part can drop out and this, in turn, requires that the plate holding the drill guide bushes be hinged or made otherwise movable so that it is clear of the nest for loading or unloading.

This article deals with a nest type of drill jig which overcomes some of the objections mentioned above. It locates the work quickly and allows loading and unloading to be carried out without the need for turning over for ejection purposes. It also eliminates the need for hinged guide bushing plates. Principle of the jig can be utilized for the drilling of components of

any size; in the case of large shaped pieces the jig offers real advantages since use of the nest method of locating is not then confined to small parts. The bigger the part, the larger the jig and the greater the operator effort needed to turn it over for unloading.

The component for which this jig is designed is shown in figure 1 and is recognizable as a link made from high carbon steel and used in a chain saw for the cutting of logs and timber. The exterior shape of the links is produced by blanking from sheet in a press and is therefore of uniform size and shape and allows the nest method of location to be used when drilling the two pin holes.

In figure 2 are shown various views of the drill jig. The nest plate is at A and a stack of six saw links can be seen therein. Most nest type jigs are designed to take one component at a time, mainly because the piece is not

clamped immovably during drilling; if there is any clearance between the nest aperture profile and the component exterior, the drills tend to wriggle the part until the full drill diameter is thoroughly started.

Another characteristic of stack drilling of thin components such as saw links, is the trouble caused by burrs on the bottom surface of each part in the stack. As the drill penetrates each separate thickness in the stack, the burr thrown up tends to force the pieces apart vertically and this allows swarf to penetrate between the pieces in the stack. Unless the stack is clamped very firmly so that it is virtually a solid mass of metal, it is possible for the burrs and swarf to bend and distort some of the pieces in the stack. To avoid these troubles, clamping of the stack of parts is provided for in the jig shown.

From Sections **Z-Z** and **Y-Y** it can be seen that the jig is clamped firmly to the table surface of a $\frac{1}{2}$ in. capacity sensitive drilling machine, the spindle of which is fitted with a light two spindle drill head so that one downward movement of the spindle drills two $\frac{3}{16}$ in. diameter holes at the same time.

The fixed portion of the jig comprises the guide bush plate **B** and the base plate **C** both of which are linked together by the vertical side members **D** welded in place to form an integral unit. Below the base plate is a sub-plate **E** cut out to form an internal space and extended side portions on which can bear the clamps holding the jig to the table **F**.

Below the guide bush plate is the nest plate **A**, and beneath this is the support plate **G**. Both the nest plate and support plate are pivotally mounted upon the vertical pin **H** at the rear of the jig and can swing out from under the bush plate in a horizontal direction to the left, as shown in the plan view.

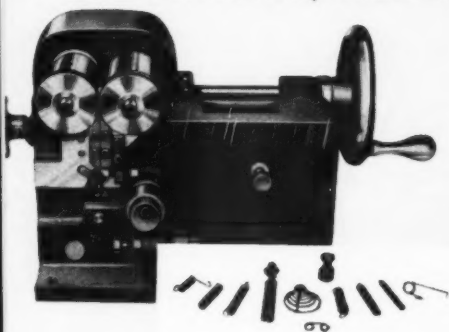
Both pivotally mounted plates are provided with extended handles which are offset in relation to one another so that each plate can be manipulated independently of the other.

To illustrate the action of the jig, two auxiliary plan views—**W** and **X**—are shown. View **W** shows the jig in the loading position with both of the pivoted plates swung out of the jig to the left and in line vertically. If a stack of six components is dropped into the aperture in the nest plate **A**, they will be prevented from dropping through the aperture by the support plate **G** which is beneath.

After the holes have been drilled in the components they are unloaded from the nest plate by moving the support plate **G** to the right so that it is underneath the jig bush plate. This is shown in View **X**. Since there is now no support offered to the components from the plate **G**, they can now drop through the hole in the nest plate and out of the jig. It will be noted from the general plan view of the jig that it is placed close to the left hand edge of the machine table. By this arrangement, handling of the drilled pieces as they fall out of the nest plate is avoided. The front section **Z-Z** shows, in dotted lines, a stack of parts falling from the nest plate and also shows the small sheet metal chute **M** which directs them into a bin placed to receive them on the floor at the left hand side of the machine.

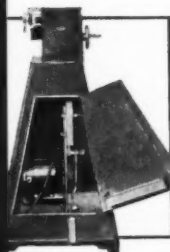
The complete loading and unloading cycle for the jig is as follows. With both pivoted plates in the position shown in view **W**, a stack of six pieces is dropped into the nest plate. The handle on the nest plate **A** is moved anti-clockwise to swivel it into the jig body and carries with it, simultaneously, the support plate **G**. The link between the two plates is the upstanding pin **I** which is a press fit in a hole drilled in the edge of the support plate. With

TWO PRECISION, TIME-SAVING, LABOR-SAVING TOOLS



Make Any Type Spring, Without Arbors, FAST With Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round and wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension, tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from $\frac{1}{16}$ " to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



Power model for continuous runs, on welded steel console base.

**EXCLUSIVE DISTRIBUTORS OF
PRECISION MACHINE
TOOLS**

**Connors and Davis
Sales Corporation**

**CIRCUIT AVENUE
WEST SPRINGFIELD, MASS.**



Hold Any Machine Work At Any EXACT Angle With Omniversal Precision Vise!



Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), Omniversal #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x $1\frac{1}{2}$ ", open to 4". Base is 9" in diameter with one side straight. Inset shows Omniversal #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, $4\frac{3}{4}$ ". Jaws, $2\frac{1}{4}$ ". Opening, $2\frac{1}{8}$ ". Base, $7\frac{1}{4}$ " x 5". For grinding, drilling or general work at any angle, by hand or machine, an Omniversal Vise is the machinist's choice.

CONNORS AND DAVIS Sales Corporation
311 Circuit Avenue, West Springfield, Mass.

Please send detailed information and prices on:

PERKINS SPRING COILER

hand ☐ power ☐

OMNIVERSAL ALL ANGLE VISE

#4 ☐ #2 ☐

Name _____ Title _____

Company _____

Address _____

City _____ State _____

both plates in the jig, the holes may now be drilled.

To unload: The handle of the support plate **G** is moved in a clockwise direction, carrying with it the nest plate and drilled pieces so that both plates are out of the jig and in the position shown in view **W**. The support plate is now swivelled anti-clockwise and back into the jig body, as shown in view **X**, thus allowing the parts to drop through the nest plate and on to the chute.

Before reloading, the support plate is swivelled back under the nest plate so that the stack of new pieces is prevented from falling through.

The clamping arrangements for compressing the pile of parts into a solid mass comprise a hardened pin **J** which is secured into the base plate of the jig by means of two nuts. The outside diameter of the pin is threaded to facilitate adjustment of the amount of projection from the base plate. The top of the pin is bevelled and rounded off to a smooth finish.

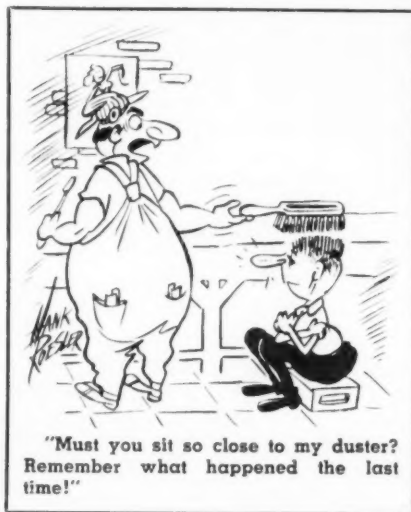
In the support plate is an aperture of a shape roughly similar to that of the nest, but smaller, so that components will be supported on the top surface of the plate and will not drop into the aperture. The aperture has a closely fitting piece **K**, called a clamping wedge, fitting therein and arranged so that it can slide in the plate vertically for a short distance. The clamping wedge is prevented from falling through the support plate by means of a pin **L** in each end engaging with short vertical slots. The wedge has a lower surface which is at slight angle to the horizontal.

When a stack of components has been loaded into the nest plate, both plates are swivelled back into the jig body, as explained previously. The moving support plate carries with it the clamping wedge, the lower inclined surface of which slides upon the rounded top

of the hardened pin **J**. As the plates are pulled further into their correct position in the jig, the pin forces the wedge upward. This has the effect of compressing the component stack and pushing it hard up against the underside of the bush plate.

One advantage of this jig which has not been mentioned is that in addition to unloading the components automatically it also unloads the swarf resulting from the action of the drills. Thus, the jig is self-cleaning and there is nothing to hold up the productive work of dropping the work into the nest plate so that it may be drilled quickly and easily.

A successful variant of this jig has been used for drilling the two bolt holes in forged flanges for small diameter pipes. In this case, six pipe flanges were loaded at one time into a nest plate having six separate apertures. No clamping means were provided; the components being supported from below by a swivelling support plate and held down from above by the bush plate. Location and sideways support was provided by the apertures in the



BEST GRIP in the BUSINESS-

Sutton Collets and feeders!



All Popular Sizes Carried in Stock for Immediate Delivery!

Sutton Collets run true and hold true! The famous "Diamond Grip" serrations attack horizontal and rotating thrusts at an angle—work is gripped tighter, spoilage is reduced, life of chucking mechanism is prolonged under a reduced tension.

Uniform Temper and Tension

Sutton's modern and exclusive heat treat method localizes controlled heat to give uniform spring temper on all collets and uniform tension on all feeders—provides added life to the collet and feeder.



**Write for
Catalog 18**
26 pages
complete with
valuable collet
and feeder
information.
Sent Free!

SUTTON COLLETS

FEEDERS and TOOLS

Sutton Tool Co., Dept. MTB11, Sturgis, Mich.

Suttons Run as True as the Spindle

now simply **READ** groove diameters

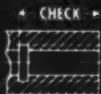


NILCO DIAL GROOVE GAGES

enable anyone to check groove diameters rapidly and accurately. These gages pay for themselves by reducing manufacturing and inspection costs.



RECESS



DEEPER THAN
STANDARD DEPTH



BLIND HOLE



THREAD RELIEF



SPECIAL GROOVES



Check grooves from $\frac{1}{2}$ " to 5"
Write for Catalog DG. Submit
drawing for quotation.

NILSSON GAGE CO., INC.

Poughkeepsie, New York

Gages available for checking "O" Ring, Truarc and other retaining ring grooves.

nest plate. No chute was necessary and the drilled pieces dropped directly past the edge of the machine table and into the bin on the floor.

There is no reason why such self-unloading drill jigs should not be used with single spindle drilling means, provided that the sequence of hole drilling is carefully decided beforehand so that the last hole to be drilled ensures that the jig is at the left hand edge of the

machine table, in the correct position for unloading. This, of course, assumes that the jig is slid about on the machine table to bring the various bushes under the single drill. With a radial drilling machine, the jig could be clamped to the machine table so that it would always be in the correct position for loading and unloading.

The End

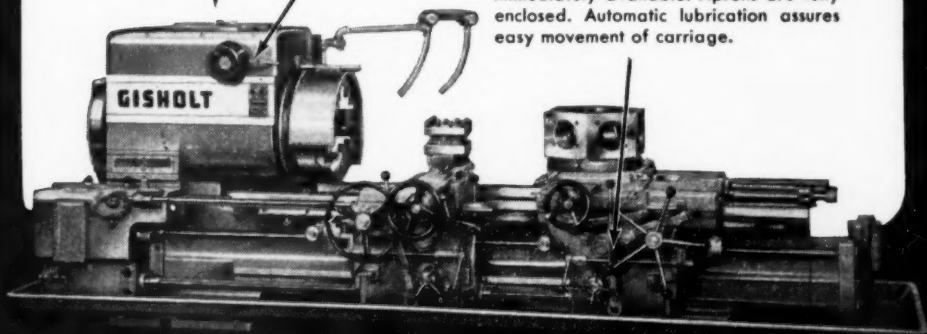
GISHOLT'S easier operation

saves you time and money...



This 21,000 lb. machine requires no more operating effort than turret lathes $\frac{1}{3}$ its weight. Despite its great power and rigidity for heavy-duty work, the new Gisholt 4-L is so fast and responsive, it can handle light work of both large and small diameters. With many machine functions entirely automatic, waste time is eliminated. Fatigue is reduced to a new minimum. Training time is shortened. Operator output is faster—more nearly constant throughout the day.

- 1 Hydraulic Speed Selector** eliminates manual gear shifting. Spindle speed changes are made instantly by power without stopping the spindle or releasing the main drive clutch. Can be operated either direct or pre-set.
- 2 Central control panel** eliminates manual effort. Provides responsive finger-tip, push-button control for start, stop, reverse, inching, chucking, and coolant supply. Automatic braking brings the work smoothly and quickly to rest.
- 3 Easy selection of feeds** is provided in the new single dial type feed selector control, making a complete choice of feeds immediately available. Aprons are fully enclosed. Automatic lubrication assures easy movement of carriage.



The new Gisholt 4-L Saddle Type Turret Lathe provides $31\frac{3}{8}$ " swing over the ways, 27" swing over carriage wing, $9\frac{1}{2}$ " to $12\frac{1}{2}$ " spindle bores and 63" longitudinal working travel of turret carriage to accommodate an unusually wide range of work. Ask Gisholt engineers about this modern, easier operating Gisholt as applied to your specific machining requirements. New literature is available.

GISHOLT

MACHINE COMPANY



Madison 10, Wisconsin

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Order

**JOHNSON
SLEEVE
BEARINGS**

from your local distributor

Johnson
Cast Bronze
GP Sleeve
Bearings



Electric Motor



Cast Bronze Graphited



Universal Bronze



Leadalloy Self-Lubricating



Babbitt Metal

All these Johnson Bearings and Bearing Metals are stock items which your Johnson Distributor can furnish. You may be surprised to find that these items will meet nearly all your needs. For example, there are over 900 sizes of Johnson Cast Bronze GP Bearings, in 48 different inside diameters from $\frac{1}{4}$ inch to $4\frac{1}{2}$ inches, in various wall thicknesses and lengths. There are over 400 sizes of Johnson Universal Bronze Bars, cored and solid. Ask your local Johnson Distributor about this line.

JOHNSON BRONZE COMPANY
615 South Mill Street • New Castle, Pa.

JOHNSON BEARINGS
Sleeve-B Type
Sleeve Bearing Headquarters Since 1901

Classification and Approximate Compositions of Principal Types of Tool Steels

	C	Mn	Si	Cr	V	W	Mo	Co	Ni
I CARBON TOOL STEELS									
A Straight-Carbon	0.60-1.40	0.25	0.25						
B Carbon-Chromium	0.60-1.40	0.25	0.25	0.20-0.75					
C Carbon-Vanadium	0.60-1.40	0.25	0.25	0.20-0.50					
II "NONDEFORMING" TOOL STEELS									
A Oil-Hardening Low-Alloy									
1. Low-Manganese	0.90	1.20	0.25	0.50	0.20*	0.50			
2. High-Manganese	0.90	1.60	0.25	0.35*	0.20*		0.30*		
3. Tungsten	1.20	0.25	0.25	0.50	0.25	1.75	0.25*		
B Air-Hardening Low-Alloy									
1. Manganese	0.90	2.50	0.30	1.50			1.00		
2. Chromium	1.00	0.50	0.25	5.00	0.50*		1.00		
C Oil-Hardening High-Alloy									
1. High-Carbon	2.15	0.35	0.35	12.00	1.00*	1.00*			0.50*
D Air-Hardening High-Alloy									
1. 1.00 Carbon, High-Chromium	1.00	0.35	0.35	12.00	0.50*		0.80		1.00*
2. 1.30 Carbon, High-Chromium	1.50	0.35	0.35	12.00	0.50*		0.80	3.50*	
3. 2.15 Carbon, High-Chromium	2.15	0.35	0.35	12.00	0.50*		0.80		
III SHOCK-RESISTING TOOL STEELS									
A Chromium-Vanadium									
1. 0.50 Carbon	0.50	0.60	0.25	1.00	0.20				
2. 0.80 Carbon	0.55	0.40	1.00		0.25*		0.50		
B Low-Silicon, Manganese									
1. 0.50 Carbon	0.55	0.80	2.00	0.30*	0.25*		0.40*		
C High-Silicon, Manganese									
1. 0.50 Carbon	0.55	0.25	0.25	1.25	0.25*	2.50	0.50*		
D Tungsten									
1. 0.50 Carbon	0.55	0.25	1.00	1.25	0.25*	2.50	0.50*		
E Tungsten-Silicon									
IV HOT WORK TOOL STEELS									
A Chromium									
1. 0.65 Carbon	0.65	0.30	0.30	4.00	0.75		0.50		
2. 0.90 Carbon	0.90	0.30	0.30	4.00	0.75*		0.50		
B Chromium-Molybdenum									
1. 0.50 Carbon	0.35	0.30	1.00	5.00	0.40*	1.25*	1.50		
C 5 Chromium, 5 Tungsten									
1. 0.50 Carbon	0.40	0.30	1.00	5.00	0.40*	5.00			
D 7.5 Chromium, 7.5 Tungsten									
1. 0.50 Carbon	0.45	0.60	1.50	7.50	0.40*	7.50			
E Molybdenum									
1. Low	0.40	0.25	0.50	3.75	0.75		5.75		
2. High	0.60	0.25	0.25	3.75	1.10	1.50	8.50		
F Tungsten									
1. 95%	0.30	0.25	0.25	3.50	0.50*	9.00			
2. 12%	0.40	0.25	0.25	2.50	0.50	12.00			
3. 15%	0.40	0.25	0.25	3.00	0.50	15.00			
4. 18%	0.50	0.25	0.25	4.00	1.00	18.00			

continued on next page

L-W

SWIVEL BASE MILLING MACHINE VISES

These Vises Can Take It!
THEY'RE BUILT FOR
BRUTE STRENGTH AND ACCURACY
Yet Are Really Low Priced!
Ideal for drill press and shaper work.

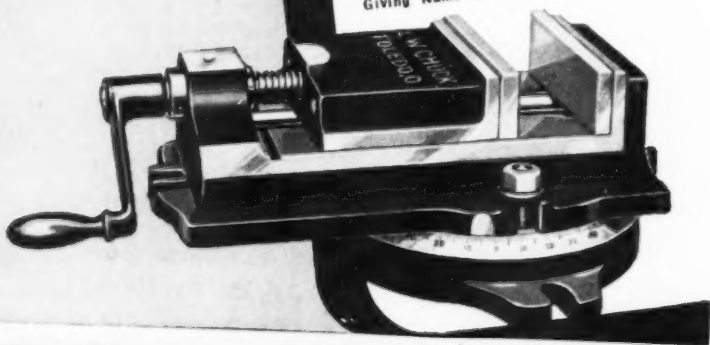
High-grade semi-steel castings. Hardened steel sliding jaws with full length bearing on a ground bar and machined ways. The 4½" and 6½" sizes have a large Acme steel screw with replaceable bronze nut. Four bolt and key slots for rigidly attaching to table so that work-holding surfaces are at true right angles or parallel to the table.

MASTER \$60.03
 Jaws: 6½" wide, 2" deep. Opens 4" with jaws, 5¼" without. Wt. complete with crank, boxed, 85 lb.

JUNIOR \$40.22
 Jaws: 4½" wide, 1¾" deep. Opens 3" with jaws, 3½" without. Wt. complete with crank, boxed 40 lb.

HUSKY \$24.00
 Jaws: 3" wide, 1" deep. Opens 2" with jaws. Wt. complete with crank, 16 lb.

Immediate Delivery. Order from Your Industrial Supply Distributor or Order Direct, Giving Name of Your Distributor.



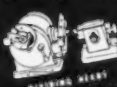
Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



DEMAGNETIZER



MAGNETIC CHUCKS



DIVIDING HEADS



RECTIFIERS



DEMAGNETIZING SWITCHES



LATHES CHUCKS



UNIVERSAL CHUCKS



POWER RACK JAWS



MILLING MACHINE VISES

L-W CHUCK COMPANY 23 SO. ST. CLAIR ST.
 TOLEDO 4, OHIO

V HIGH SPEED TOOL STEELS

A Molybdenum									
1. Molybdenum-Vanadium	0.85	0.30	0.25	4.00	2.00	....	8.00	....	....
2. Molybdenum, Low-Tungsten, 1 Vanadium	0.80	0.30	0.25	4.00	1.00	1.50	8.50	....	....
3. Molybdenum, High-Tungsten, 2 Vanadium	0.85	0.30	0.25	4.00	2.00	6.25	5.00	....	....
4. Molybdenum, High-Tungsten, 4 Vanadium	1.20	0.30	0.25	4.00	4.00	6.00	4.50	....	....
B Molybdenum-Cobalt									
1. Molybdenum, Low-Tungsten, 5 Cobalt	0.65	0.30	0.25	4.00	1.00	1.50	8.50	5.00	....
2. Molybdenum, Low-Tungsten, 8 Cobalt	0.85	0.30	0.25	4.00	2.00	1.50	8.50	8.00	....
3. Molybdenum, High-Tungsten, 5 Cobalt	0.85	0.30	0.25	4.00	2.00	6.25	5.00	5.00	....
4. Molybdenum, High-Tungsten, 8 Cobalt	0.85	0.30	0.25	4.00	2.00	6.25	5.00	8.00	....
C Tungsten									
1. 18 Tungsten, 1 Vanadium	0.70	0.30	0.25	4.00	1.00	18.00	....	....	....
2. 18 Tungsten, 2 Vanadium	0.85	0.30	0.25	4.00	2.00	18.00	0.75	....	....
3. 18 Tungsten, 3 Vanadium	1.00	0.30	0.25	4.00	3.00	18.00	....	....	....
D Tungsten-Cobalt									
1. 14 Tungsten, 2 Vanadium, 5 Cobalt	0.80	0.30	0.25	4.00	2.00	14.00	0.75	5.00	....
2. 18 Tungsten, 1 Vanadium, 8 Cobalt	0.75	0.30	0.25	4.00	1.00	18.00	0.75	5.00	....
3. 18 Tungsten, 2 Vanadium, 9 Cobalt	0.80	0.30	0.25	4.00	2.00	18.00	0.75	9.00	....
4. 20 Tungsten, 2 Vanadium, 12 Cobalt	0.80	0.30	0.25	4.00	2.00	20.00	0.75	12.00	....

VI MISCELLANEOUS TOOL STEELS

A Die Iron									
1. 0.70 Carbon, 0.30 Molybdenum	0.05	0.10	0.03	....	....	....	....	....	1.25
B Low-Chromium, Nickel									
1. 0.10	0.45	0.25	0.60	....	....	....	....	....	3.50
C High-Chromium, Nickel									
1. 0.12	0.45	0.25	1.50	....	....	....	....	....	....
D High-Chromium									
1. 0.35	0.35	0.20	12.00	....	....	....	....	....	....
E Nickel-Chromium									
1. 0.75	0.60	0.20	1.00	....	0.10*	....	....	....	1.75
F Nickel-Chromium-Molybdenum									
1. 0.70 Carbon, 0.30 Molybdenum	0.70	0.70	0.20	0.80	0.10*	....	0.30	....	1.00
2. 0.50 Carbon, 0.30 Molybdenum	0.50	0.65	0.25	1.00	0.10*	....	0.30	....	1.60
G Chromium-Molybdenum									
3. 0.55 Carbon, 0.75 Molybdenum	0.55	0.60	0.85	1.00	0.10*	....	0.75	....	2.00
H Chromium-Manganese									
1. 1.25	0.60	0.20	0.50	....	....	....	....	....	....
I Chromium-Manganese-Molybdenum									
1. 1.25	0.85	0.20	0.50	....	....	....	0.50	....	....
J Chromium									
1. 1.00	0.30	0.20	1.40	....	0.20*	....	0.30*	....	....
K Finishing									
1. 1.35	0.25	0.20	0.75*	....	....	3.50	....	....	....

* Optional element. Steels have found satisfactory application either with or without the element present.

The purpose of this table is to give the reader a condensed list of the principal steels used by industry in each group. It should be understood that other steels have been found satisfactory for the specific applications covered in the chart, but they are not used generally. Except for the carbon tool steels, the quantity of each element present is given as a nominal percentage. This is done to simplify the chart and indicate the type of steel only. These figures cannot be used as a specification. In some instances optional (*)

elements are listed. This means that these steels have found satisfactory application either with or without the element present, and generally no change of treatment is required.

The numerical designations employed in this table (1A, 1B2, VC3, etc.) are used to identify the same steels in the articles on heat treatment of tool steels in the next table.

Courtesy: American Society for Metals and ASM Handbook, 1948 edition.

Precision Micrometer



With Special Ratchet
For One Hand Use



You will be gratified by the limitless convenience and superb workmanship of this outstanding micrometer, product of TESA, world-renowned manufacturers of precision measuring tools. It provides accuracy-touch at your fingertips, and beautifully balanced "feel."

MICROMETER
RANGE 0-1"
READING IN .0001"

ONE-HAND RATCHET
LOCK NUT
CARBIDE FACES

NO. AK 1 WE
\$21.50 F.O.B. New York.
With Form Fitting Case.

UNIVERSAL TEST INDICATOR

A Highly Sensitive DIAL INDICATOR
Made with the precision of a Swiss watch



RANGE .06"
READING IN .0005"
DIAL 0-15-0
POINT .08" DIAMETER
SHANK .275" x .4

Interchangeable points may be set at any angle within 180°. Rotating dial for Zero setting.

PRICE F.O.B. New York.
With Form Fitting Leatherette Case

No. Y 2015 E Test Indicator w/Shank \$28.00
Y 201 E Test Indicator 20.60
Y 51 Shank 7.40
Additional Point 1.10



No. CC 20 C All-Purpose Precision Vernier Caliper
With Depth Gauge and Jaws for Measuring
Inner and Outer Dimensions. Lock Screw.

Entirely of Stainless Steel.

SCALE 7"; RANGE 6"; JAW LENGTH 1.5"; VERNIER
READING 1/64" Upper; .001" Lower

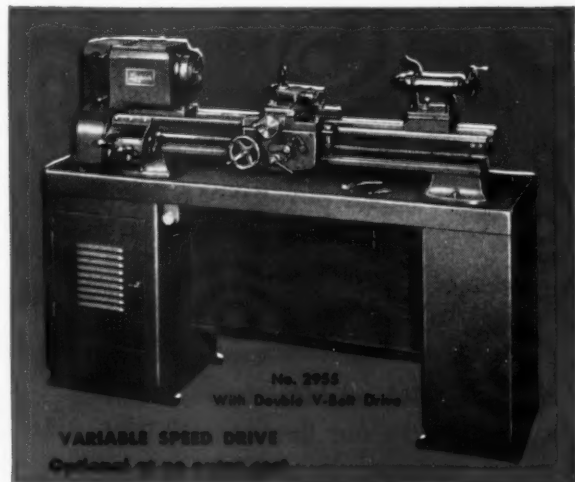
\$21.95 F.O.B. New York.
With Form Fitting Leatherette Case

Immediate delivery on these and other TESA Precision measuring tools. If your local distributor cannot supply you write us for complete details and literature. Dealer inquiries invited.

P.I.T. PRECISION INSTRUMENT
& TOOL CORPORATION
1775 Broadway, New York 19, N. Y.

VERSATILE 12" SWING LOGAN LATHE

FOR PRODUCTION, TOOL ROOM, MAINTENANCE, SCHOOL SHOP



In versatility, accuracy and value, this 12" Logan Lathe is new. Wide speed range, sustained accuracy, and rigidity on heavy cuts are inherent in its massively proportioned ball bearing spindle. The heavy headstock, double V-belt drive, and heavy-ribbed bed with two V-ways and two flat ways precision ground to within .0005", mean lasting accuracy in production. The completely machined saddle and large, accurate dials are typical features adapting it to exacting tool room work. With 1" collet capacity, 1 1/4" spindle hole, and either 23" or 35" center distances, the 12" Logan can put new efficiency and more profit in most lathe turning operations.

SEE THIS NEW LATHE AT YOUR LOGAN LATHE DEALER'S, OR

Write for
Information...

Full catalog descriptions and price information on request.

Write today to

LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS



SMOOTH
On Heavy Cuts

With smooth power this 12" Logan hogs out a .375" cut from bar stock. Extra weight in the headstock... a massively proportioned spindle turning on oversize ball bearings assure the rigidity and sustained accuracy that makes heavy cuts easy.



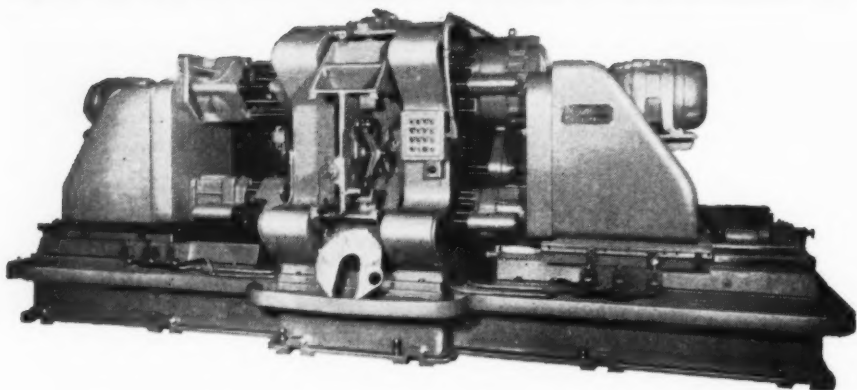
ECONOMY
In Production

Typical parts made on Logan Lathes and held to closest tolerances at minimum cost per finished part. Rugged, accurate Logans keep production at top efficiency.

Brief Specifications

Swing over bed and saddle wings, 12" ... Center Distances, 23" and 35" ... Turret Lathes Models have 43" bed length ... 1 1/4" spindle hole ... 1" collet capacity.

SPECIAL DOUBLE-END DRILLING, BORING and TAPPING MACHINE



Illustrated is one of the special machines we are constantly building, in addition to our line of MULTIPLE DRILL HEADS, to meet the specific requirements of plants, large and small. This machine is used for drilling, boring and tapping the adapter plate on an automatic transmission . . . The part is completely bored, drilled and tapped on this machine. We are using two of our Standard HH-20 Horizontal Way Type Units with an Automatic Index . . . The complete cycle is 30 seconds. The part is clamped with hydraulic cylinders.

We solicit your inquiry as to any special drilling, milling or boring operations you may have.



MICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD



HAZEL PARK, MICH.

Flame-Plating Protects Parts From Wear

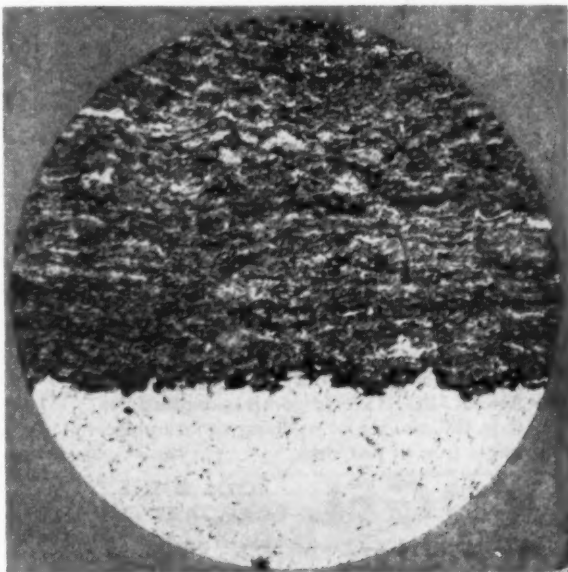
A method of applying thin metallic coatings on metal parts

FLAME-PLATING is a new method for applying hard, thin, precise coatings of powdered metals, such as tungsten carbide, on metal parts, and is being used to help solve frictional and abrasive wear problems. Flame-Plating was developed by Linde Air Products Co., Dept. BB, 30 E. 42nd St., New York 17,

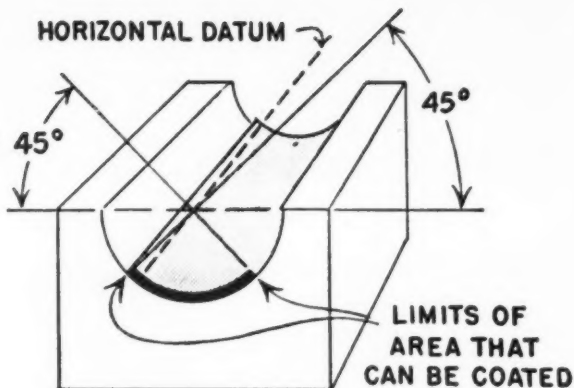
N.Y., a division of Union Carbide and Carbon Corp. Tungsten carbide coatings from 0.0005 to 0.020 in. thick are currently being applied.

Flame-Plated tungsten carbide coatings have the desirable properties of sintered tungsten carbide, while at the same time avoiding some of the limita-

1. Photomicrograph of a Flame-Plated tungsten carbide coating (dark area) applied to a mild steel base (light areas). Each particle in the coating is elongated and flattened into a thin disc. Even though there is a distinct boundary between the coating and the base, there are no voids or visible oxide layers. The coating has a fine grain, dense, laminar structure with negligible porosity. Approximately 300 magnifications.



2. Inside cylinder walls—coatings can be deposited to a depth equal to the diameter of the hole.



tions of the sintered form. Tests claim to have shown that the coatings have wear and abrasion resistance that is as good as, or better than, sintered carbides. Although several coating materials are being tested for use with the Flame-Plating process, much of the initial work has been done with tungsten carbide, figures 1 and 2, and all

present commercial applications use this material.

One of the biggest features of this new method is that the temperature of the base metal does not exceed 400 deg. F. during the plating operation. This low-temperature deposition practically eliminates any possibility of a change in the properties of the part being plated, and



Notch 12 PIPE ENDS per MINUTE

Make Perfect Joints for Welding or Brazing

ARCFIT

REG. U. S. PAT. OFF.

**NOTCHES CLEAN
NO FINISHING**



Standard ARC-FIT in hand or power press shears contours for "T" joints for 1/2" to 2" pipe or tubing with easily interchanged dies. Special ARC-FITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.

VOGEL

TOOL & DIE CORPORATION

1825 N. 32nd AVE. • MELROSE PARK, ILL.

Send for descriptive literature

Standard Arc-Fit works well in our special HAND PRESS





DUST is no joke!

ELIMINATE ABRASIVE DUSTS AND IMPROVE WORKING CONDITIONS WITH TORIT DUST COLLECTORS

Here a Torit 19-FB Dust Collector is eliminating bad dust and lint conditions connected with the polishing of rock drill bits. Wheel hoods, too, are Torit designed.

Note how completely the wheels are hooded, yet there is no interference with operations. The powerful suction of the Torit Dust Collector insures that no dust gets in the operator's eyes.

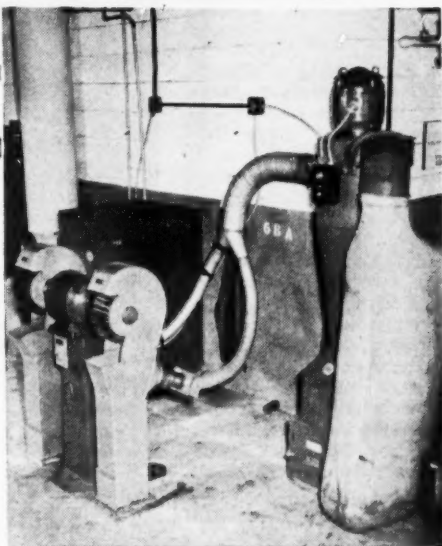
With Torit Dust Collectors you see what's going on. The compact units take up little room. They set close to machines to minimize piping and reduce friction losses.

To see the end of dust in your plant, call on Torit. Standard model Torit Dust Collectors fit most operations, and special adaptations can be quickly fabricated. Just write to:

see our catalog in



or write for copy



TORIT

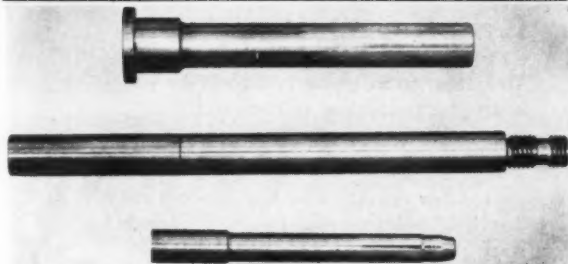
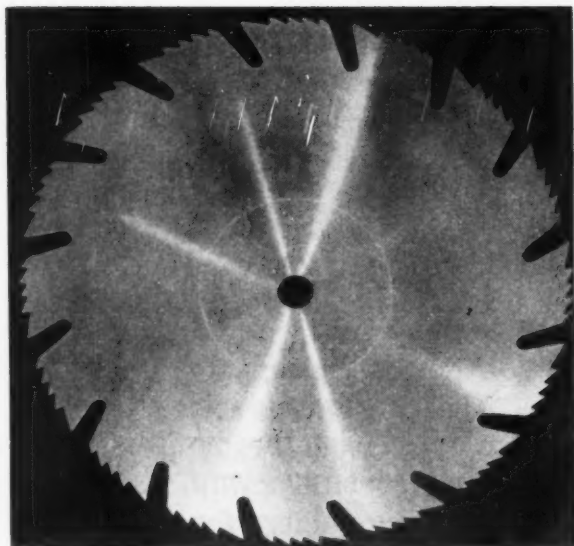


Torit Dust Collectors are available in both cabinet and cyclone types, in sizes ranging up to 5 H. P. capacity.

TORIT MANUFACTURING CO.

303 Walnut Street St. Paul 2, Minn.

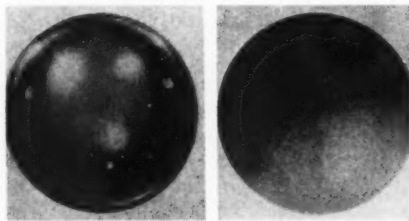
3. Applications of Flame-Plating include such items as the teeth of this 10" circular saw blade that have been plated to help them keep their "bite" longer. For this application, no grinding or polishing of the coating is necessary. **Core rods** must resist severe abrasion and be tough enough to withstand a certain amount of loading and deformation. A hard coating of Flame-Plated tungsten carbide over a strong steel base provides the abrasion resistance. **Spheres**, such as these balls used in check valves, are Flame-Plated. The $\frac{7}{8}$ " dia. steel ball at the right is shown as coated. The one at the left has been finish ground.



reduces to a minimum the chance that the part might warp. Some applications, such as the teeth of a circular saw blade or the barbs of a cotton-picking spindle, figures 3 and 4, do not require any grinding. The surface finish of as-coated tungsten carbide applied by Flame-Plating is approximately 125 micro-inches rms.

Resinoid bonded diamond wheels are the only grinding wheels suitable for finishing a Flame-Plated surface. A 100-mesh wheel is used for rough-grinding and a 400-mesh wheel for finish-grinding when no more than 0.005 in. is to be removed. Before and during grinding, the part is flooded with a suitable coolant.

All commercial Flame-Plating is done

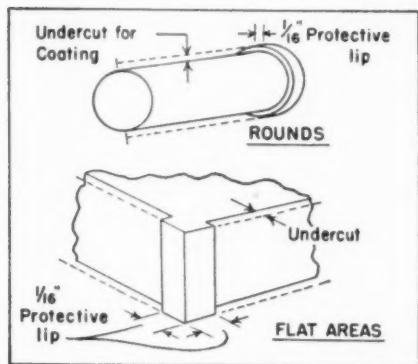


at the Speedway Laboratories of Linde Air Products Co., Indianapolis, Ind. Parts are prepared by the customer, sent to Speedway for coating, and returned to the customer. If the parts require finish grinding, the customer has this work done.

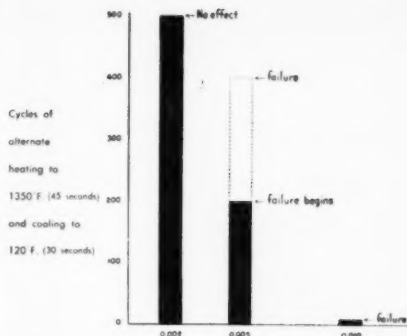
Parts to be Flame-Plated are undercut



4. A 0.001" thick Flame-Plated coating protects the barbs of this cotton-picker spindle from an unusual wear condition. In this application, no grinding or polishing is necessary.



5. Parts to be Flame-Plated should be undercut just deep enough to allow for the desired thickness of the coating.



6. Thermal shock resistance of Flame-Plated tungsten carbide as affected by coating thickness.

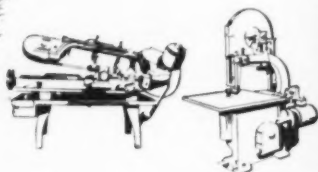
just deep enough to allow for the desired thickness of the coating, figure 5. A small protective lip of base metal is usually left at any sharp edge where the part may be subjected to abuse or where two Flame-Plated surfaces meet at a sharp angle.

After a coating is applied, it can be ground and lapped to a finish of approximately 2 microinches rms. Finish

Some Figures on Flame-Plated Tungsten Carbide Coatings Currently Being Applied

Composition	92% tungsten carbide; 8% cobalt
Hardness	1200 to 1500 Vickers (300 gm. load)
Coating Thickness	Maximum—0.020 in.; Minimum—0.0005 in.
Surface (As Coated)	125 microinches rms (Brush Analyzer)
Surface (After Finishing)	2 microinches rms (Brush Analyzer)
Base Materials	Steels, cast iron, aluminum, copper, brass, bronze, titanium, magnesium
Temperature of Base Piece during Application of Coating	Less than 200 deg. centigrade
Size of Base Piece (Other sizes and shapes can be handled with special jigs and fixtures.)	<div>Round</div> <div>Flat</div> O.D. — from 1/8 in. to 6.0 in. As coated — 6 in. by 40 in. Length — to 40 in. Finish-ground — 3/4 in. by 40 in.
Shape of Base Piece	Externally — any area at no greater than 45° from a horizontal datum

THE NEW MILFORD REZISTOR HIGH SPEED STEEL BAND TOOL



A REVOLUTIONARY, NEW, HIGH SPEED STEEL CUT-OFF TOOL DESIGNED SPECIFICALLY FOR CUTTING STAINLESS, DIE STEELS AND OTHER TOUGH FERROUS ALLOYS FASTER, MORE ECONOMICALLY.

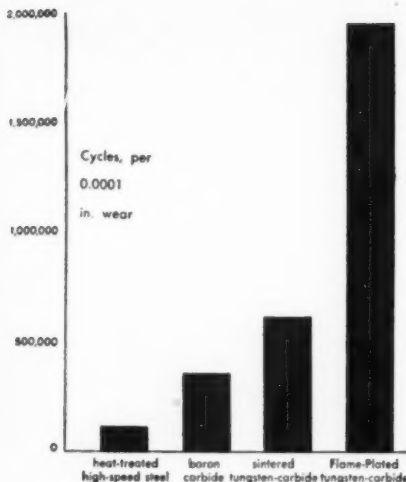
- CUTS TWICE AS FAST . . . as conventional carbon steel band saw blades when sawing tough alloys.
- CUTS UP TO 30 TIMES LONGER . . . as proved by actual, on-the-job tests in the field.

Now a band saw machine can be used for cutting steels that heretofore could be cut only with a power hack saw blade. The MILFORD REZISTOR Band Tool cuts smoother, faster and more accurately—chip loss of expensive metal is reduced. Descriptive circular and price lists available. Contact us direct or through your local MILFORD distributor.

STANDARD OF QUALITY THE WORLD OVER
THE HENRY G. THOMPSON & SON CO.



SAW BLADE SPECIALISTS FOR OVER 76 YEARS
NEW HAVEN 5, CONNECTICUT
PROFILE BLADES AND BAND SAW BLADES
HAND AND POWER HACK SAW BLADES
Buy MILFORD Blades through your local MILFORD Distributor or mail order. For his ability and prompt service we serve you best for ALL YOUR INDUSTRIAL NEEDS.



7. Results of wear tests on plug gages; wear medium—cylinder block cast iron.

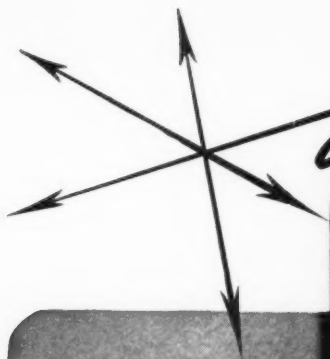
specifications are determined by the requirements of the part. Costs are greatly influenced by several factors, including size and shape of area, thickness of deposit, and quantities involved.

The bond between the base metal and the coating is mechanical—it is not a welded bond. Because of the unique way in which the coating is applied, there is no mixing of the coating with the base metal.

Flame-Plating is adaptable to many different base metals in a wide variety of sizes and shapes. Steels, cast iron, aluminum, copper, brass, bronze, titanium, and magnesium have all been successfully coated. Flat areas, cylinders, spheres, internal areas, and many irregular shapes have been coated.

The End

Please mention
MACHINE and TOOL BLUE BOOK
when writing to advertisers



LATHE CARRIAGE FLEXIBILITY

Nichols Miller

PRODUCTION MODEL

Precision turning, boring and re-cessing jobs that are normally assigned to toolmaker's lathes or expensive boring machines, come natural to the versatile NICHOLS Millers.

Rapid Lever Actions on the Spindle Head, Table, and Saddle provide unparalleled flexibility of movements. The Lever Transverse Feed, an exclusive NICHOLS development, is especially valuable. Makes NICHOLS different from other hand millers. It adds "lathe-carriage flexibility" to your most intricate machining operations, while maintaining tolerances to "tenths." Work can be chucked lathe-fashion on the spindle with tools mounted on the table or vice versa.

Adjustable positive stops, quick-acting locks on sliding movements, and the highest degree of precision are standard equipment.

"THE MILLER THAT USES ITS HEAD"



Send for free illustrated brochure.

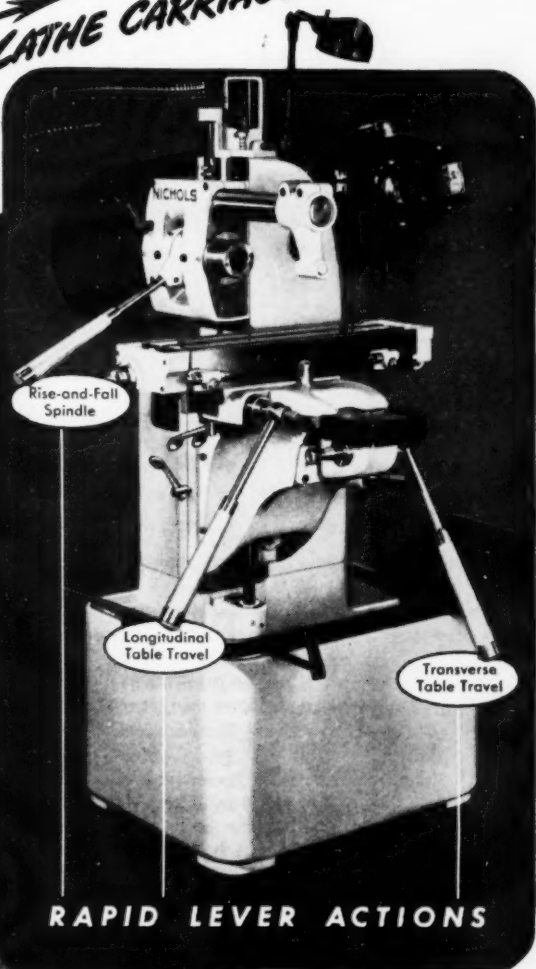
MANUFACTURED BY W. B. NICHOLS COMPANY, WALTHAM, MASSACHUSETTS



NATIONAL DISTRIBUTORS

NICHOLS-MORRIS CORPORATION

50-G Church Street, New York 7, N. Y.



RAPID LEVER ACTIONS

CONDENSED SPECIFICATIONS

Table Working Surface	6 1/4" x 21"
Longitudinal Table Travel	10"
Transverse Table Travel	7"
Vertical Travel of Knee	13"
Rise and Fall of Spindle	4 1/2"
Selective Speed Ranges up to	5000 R.P.M.
Weight	1250 lbs.

What New Material Shall I Use . . . ?

By **Julius J. Harwood**, Assistant Head
Metallurgy Branch, Office of Naval Research
Department of the Navy
Washington, D.C.

Electronic, Magnetic and Electrical Materials

Few items have stirred the electronic industry as much as the recent development of transistors. As small as hairpins in size, transistors bid fair to revolutionize many applications now utilizing electronic vacuum tubes. Their small size and weight, low voltage requirements, no necessity for cathode heaters, and their ruggedness and long life make it likely that a considerable percentage of small vacuum tubes will be replaced by transistors. The heart of the transistor is a semiconductor material, usually germanium. Semiconductors have electrical properties between those of insulators and metallic conductors. As the temperature increases, their resistance decreases. The action of a semiconductor like germanium depends upon the type and amount of impurities present; for example, one part of antimony in 100 million parts of germanium doubles its conductivity. Semiconductors

such as germanium, silicon and selenium pass current in one direction and therefore have rectification properties. Germanium diodes, which are merely metallic whiskers in contact with germanium pellets, are used extensively for radar, military and commercial electronic devices.

The transistor, which is a three terminal semiconductor device, is capable of use as an amplifier and oscillator. The early transistors were of the point contact type which consisted of two wires in contact with a button of germanium the size of a match head. The development of the junction transistor, which is a solid piece of germanium with different impurity contents and electrical characteristics along its length, was aided by the development of zone melting. Zone melting consists of a small molten zone traversing a relatively long solid alloy and permits a controlled distribution of solute elements and impurities throughout the charge. In view of the limited operating temperatures of

A Summary of Recent Developments

. . . part 2

germanium transistors (up to 80° C), their relatively high noise level, present high cost and possible limited availability of germanium, other semiconductor materials are being investigated. Silicon is another potential transistor material and recent research has introduced an aluminum-antimony compound as a promising development. The electrical properties of Al-sb are as interesting as those of germanium and silicon, and there are possibilities that still other compounds of aluminum, gallium and indium with arsenic and antimony may prove to be useful. The advantages of the compounds would be in their lower cost and higher permissible operating temperatures. These materials may also be useful photo-electric materials. When one considers that a B-36 airplane contains more than 2000 vacuum tubes and the eventual possibility of reducing more than 90% in the overall weight of electronic equipment in a plane with increased reliability, the importance of transistors to the military becomes obvious. Similar considerations also apply to the radio and television industry and transistors may permit an enormous reduction in the size of electronic computers. Small hearing aids

employing transistors are now on the market and wrist watch radios now become a distinct possibility. The conservation of strategic metals such as nickel and tungsten also is an important feature of this development.

Magnetic materials are indispensable in modern industry. Communication equipment, electronic power equipment, automotive and aircraft engines all depend on magnets. Several years ago, the ferrites and fine iron powder magnets were receiving considerable attention to replace magnetic materials high in nickel and cobalt content. Recently, the development of another material, a compound of manganese and bismuth (known as Bismanol), was announced. Perfected in a Naval Laboratory, manganese bismuthide appears ideally suited for applications requiring high magnetic flux density such as loud-speakers. The material exhibits a coercive force exceeded by no other known practical magnets. It can be used for almost all present applications of permanent magnets and its substitution for Alnico V and other magnetic materials may result in considerable savings of nickel and cobalt. Bismanol is stable magnetically to shock, vibration, centrifugal

forces and stray magnetic fields. It corrodes somewhat in humid atmospheres, and may require protection by external coatings, such as nickel, under moist conditions. Mismanol magnets are made by powder metallurgy techniques from powdered manganese bismuthide.

In the field of soft, non-retentive magnetic materials, thin sheets of oriented silicon steels have been developed under Navy sponsorship for applications involving frequencies in the range of 400-20,000 cycles and for pulse components. Economical to fabricate, with good workability and providing high permeabilities, low hysteresis losses and low interlamination energy losses, these steels are finding a host of applications in motors, amplifiers, transformers, generators and many other electrical components. Aligning the axis of magnetization parallel to the rolling direction, by proper combination of composition and working procedures, has afforded superior magnetic properties with the oriented silicon thin steels.

Recent work in Navy laboratories has resulted in the development of methods

of fabrication 16% aluminum-iron alloy into thin gage sheets. The magnetic properties of this alloy (called Alfenol) indicate its potentialities as a laminated core material and in applications where non directional magnetic properties may be desired. It has high permeability, rectangular hysteresis loops and extremely low anisotropy. The material has been cold-rolled to sheet as thin as .00003". The high temperature oxidation resistance, high electrical resistivity and low thermal conductivity of these thin sheets point to other possible applications.

Another of the refractory metals, rhenium, is receiving research attention for potential electrical applications. At present, rhenium is rare and costly; the present price being \$800 per pound. It appears that rhenium may have superior properties than tungsten for electron tube components.

Ceramic Materials

In the field of ceramic materials, one of the most interesting recent developments has been the production of synthetic mica-ceramics. As an outgrowth of government research programs on the synthesis of single crystals of mica or mica sheets, this material is now being produced on a pilot plant scale and is being evaluated commercially for such applications as general machinable ceramics, electrical insulating ceramics, frictional materials and for radomes. Mica ceramic shapes are made by hot pressing poly crystalline mica powder and are soft enough so that they can be conveniently precision-machined and precision-finished after pressing with conventional machining operations. They have low water absorption characteristics, temperature stability up to about 800° C and dielectric properties as good or better than most other ceramic dielectric insulators.

Another recent ceramic development is the low coefficient of expansion lithium ceramics. The lithium aluminosili-

Mechanics Through the Ages

A collection of 63 of the more popular mechanics cartoons published in the MACHINE and TOOL BLUE BOOK over the past few years. Bound in a hard-cover it withstands constant wear. Cartoons are instructive, entertaining and make worthwhile reference tools. Available from Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, Ill. Price: One dollar.

cates which comprise this group have a range of low coefficient of expansion from negative to positive including compositions with zero expansion characteristics. These materials, therefore, have a high resistance to thermal shock and have good oxidation resistance at temperatures up to 2000° F. They are fabricated by conventional ceramic techniques and are in the same price range as porcelain or the steatites. Their field of applications will be those in which thermal shock resistance and controlled thermal expansion properties are desirable as for example, kiln hardware, thermo-couple protection tubes, plug and ring gages, furnace liners, etc.

Coatings

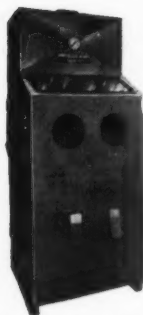
One of the most fruitful methods to aid in the conservation of our critical metals and to increase the operating life of components and equipment lies in the development of improved coatings.

One-coat, chip resistant, porcelain enamels with coating thickness as low as .003" and lower firing temperatures of the order of 1350° F are now available. These titania enamels are finding extensive use for home appliances and similar type applications and do not require the use of premium type steels. For more severe high temperature applications, such as tailcones, flameholders, afterburner, and combustion liners and other jet engine components, recent improved ceramic coatings are making possible two types of benefits. Not only are the highly alloyed high temperature materials being protected from oxidation, corrosion and erosion by the gaseous products of combustion, with a substantial increase in service life, but they are leading to the use of ceramic coated low alloy steels to replace the critical and expensive alloys currently being used for hot gas resistance. These coatings have high resistance to chipping

Pressure Blast Application

#206

Only Pressure Blast Gives You 2-Speed Wet-Blasting!



MODEL A... ONE OF 4 STANDARD UNITS. CUSTOM MACHINES DESIGNED TO FIT SPECIAL REQUIREMENTS.

Before Pressure Blasting



Pressure Blast is used on carbide tooling with phenomenal success for cleaning the shank and tip prior to brazing . . . removing excess brazing material . . . as an aid to the visual inspection of tips for cracks and flaws . . . honing of tips after sharpening for removal of burrs, feather edges and directional grinding lines.

After Pressure Blasting



FREE . . . Learn what **PRESSURE BLAST** can do for you! Die and Mold Polishing, Blending Grind Lines, Deburring, Heat Treat Scale Removal, Honing of Cutting Tools, Pre-plating Cleaning . . . Hundreds of proven, money-saving applications!

Write for our new 8 page fully illustrated Booklet . . . or send samples of work you want tested to:

The **CRO-PLATE** Company, Incorporated
747-7 Windsor Street Hartford 5, Conn.

and to thermal shock, oxidation resistance to 2200° F and show a freedom from cracking and blistering. In some cases increased fatigue life also results from the use of such coatings. The life of inconel and stainless steel parts have been extended as much as 300%. The coatings are formulated specifically for each type of alloy composition and while little information is available concerning the composition of the coatings, frits containing chromic oxide appear to be of general use. Dipping or spraying methods are employed. Coatings have also been developed which will protect mild steel up to 1200° F.

Another ceramic type coating, known as the HAE coating, has been developed for magnesium alloys. Applied by an electrolytic process, the HAE coating has exhibited excellent corrosion abrasion and heat resistance. One of the outstanding characteristics of the HAE coating is its resistance to salt spray corrosion. The coating is used usually in conjunction with wax sealers, phenolic finishes or zinc chromate primers and have under test enabled magnesium alloys to withstand more than 13,000 hours of salt spray exposure. It also provides an excellent base for paint systems. It is anticipated that the HAE and other similar types of coatings will expand the use of magnesium alloys for many parts formerly considered impracticable. Some of the items which have been tried include magnesium propellers, rocket launchers and numerous structural components of air frames.

Low temperature (40°-60° F) anodizing treatments for aluminum also are available which provide a hard surface coating with good abrasion, wear and corrosion resistance.

Recent announcements have indicated the development of two new methods of the deposition of tungsten carbide hard faced surface coatings. One involves an inert gas shielded arc method in which the carbide particles are

poured from a vibratory hopper into a melted pool of the base metal behind the arc. The process is automatic and fast and results in good bonds and shallow heat affected zones. Little dilution of the carbide particles occurs and the abrasion resistance qualities of the coatings indicate their use for drilling tools.

The other process known as "Flame Plate" deposits tungsten carbide in the form of thin undiluted coatings ranging from 0.0005"-0.020" thick. The temperature of the base metal never exceeds 400° F during the plating process and various sizes and shapes can be coated. Many metals have been coated including cast iron, aluminum, brass, titanium, magnesium and steels. The coating is very hard and greater wear resistance than sintered tungsten carbides is claimed. Such applications as plug gages, drawing dies, core rods for powder metallurgy, broaches, valve tappets are being tried. Similar processes have been developed also for the deposition of alumina (aluminum oxide) coatings on metals which provide wear and abrasion resistant surfaces.

Improvements in the chromizing process have made it possible to chromize



feasibly medium carbon and high carbon steels and have resulted in thicker, more uniform, and superior chromized coatings. These coatings are finding increasing use in applications for wear and abrasion resistance, resistance to high temperature oxidation and corrosion resistance. Steel parts can be heat treated after chromizing operations to regain mechanical properties which may be affected by the chromizing operation which takes place between 1650°-2000° F. Depending upon the size of the part,

chromizing may be as economical as some types of chrome plating. One of the advantages of chromizing is the ability to use a low carbon steel core with a high chromium stainless steel surface.

One of the most promising and fast growing developments in the field of coatings is the use of organic resin coatings and plastic piping materials. These organic systems can be sprayed, dipped, brushed or flow coated and in general, provide flexible films with good adhe-

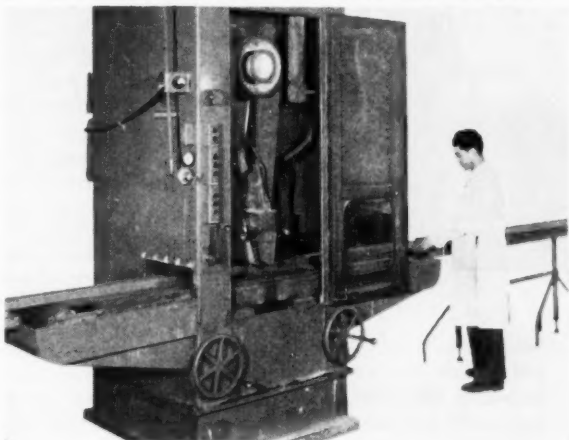
Grinding aluminum extrusions with coated abrasives

Aluminum extrusions are widely used in the manufacture of metal doors, window frames and ornamental trim. These items are normally given a satin or anodized finish, which requires preparatory grinding, sanding or polishing.

Because these extrusions usually come in 21-ft. lengths, the handling problem for any form of grinding has heretofore been difficult and costly.

The operation can now be performed, it is claimed, at substantial saving in production cost with the Curtis Straight-O-Matic machine in conjunction with Carborundum's abrasive cloth belts. This setup, shown in the accompanying photograph, accomplishes the polishing of extruded aluminum so rapidly that it has eliminated the five to six backstand operations formerly needed to meet production requirements.

One pass with a 120-grit belt, at a feed speed of 10 to 15 ft. per min., has been found sufficient to remove surface imperfections or scratches from the extrusions. Surface finish requirements are dependent on whether or not the

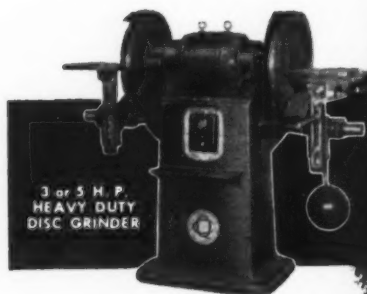


material is to be anodized. Experience shows that surfaces obtained with 120 to 400 grit are suitable for anodizing. Oil, greases or water may be used in addition to plain dry grinding.

If a one-pass operation is to be employed, a 40 to 50 durometer contact wheel is recommended, to conform with the bow or twist in the piece. If finer finishes are desired, a 70 durometer contact roll used for the initial coarse pass will size the stock as well as remove the necessary material and imperfections. The 40 to 50 durometer contact roll is used on the finish fine grit passes which are run at feed speeds of 30 to 40 ft. per min.

**"Time Savers
in any shop"**

**QUEEN CITY
heavy duty
DISC GRINDERS
and BUFFERS**



Queen City Heavy Duty Disc Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . in sizes from $\frac{1}{2}$ to 10 H. P. . . is described in a free 24-page catalog.

Write for detailed literature

**QUEEN CITY
MACHINE TOOL CO.**

QUEEN CITY
MACHINE TOOL CO.
3912 Kellogg Avenue
Cincinnati 26, Ohio

"Queen City Grinders—Famous For Over 50 Years"

sion and excellent chemical resistance to a variety of acids, bases and chemical solvents. Hot sprayed resins, in particular afford convenient and effective corrosion resistant coatings. These applications are becoming increasingly extensive in the food processing, chemical plant, petroleum, pipe line and other industries. Vinyl coatings and the recently developed epon or eponic coatings are popular. The newly announced developments for the surface coatings of metals with fluoroethylene films, such as Teflon or Kel-F are of great significance. Now the outstanding chemical inertness and the dielectrical and low-frictional properties of these materials are available as surface coatings. These films are either applied by new adhesive bonding techniques or by suitable dispersion techniques.

It has been stated that one of the most outstanding advances within the last ten years in the field of paint systems for corrosion resistance has been the development of the so called "Wash Primer." Consisting of a mixture of polyvinyl butyral polymer, zinc tetroxy chromate and phosphoric acid, it is really a metal conditioning treatment rather than a primer. The coating has excellent adhesion characteristics and makes an ideal undercoat or primer for ship hull paint systems which out perform all existing paint systems. The Wash Primer treatment has been successfully applied to steels and aluminum and under some conditions to magnesium alloys.

In the field of metal plates, mention should be made of the new development in the electro plating of aluminum from organic electrolytes and the "electroless" plating of nickel. The latter process involves the plating of nickel by a chemical reaction rather than by electrolysis, using hypophosphite as a reducing agent for nickel compounds. The advantages of electroless nickel are in its ability to plate metal surfaces which

are beyond the throwing power of conventional electrolytic baths, its increased wear resistance and the possibility of obtaining comparable corrosion resistance to nickel electroplates with thinner coatings. If the claims for the electroless plates are substantiated by service experience, it may be anticipated that the process will make serious inroads in the nickel electroplating field since the method offers the possibility of less porous and more corrosion resistant plates and a substantial advantage in nickel conservation. Electroless

nickel plates can also be used for plastics and other non-metallic materials.

Low temperature vapor deposition of nickel and other metal coatings and the chromium plating of aluminum for abrasion resistance are other noteworthy items in the coating field.

One should not omit from any discussion of corrosion-resistant methods the use of cathodic protection. Involving electrochemical principles formulated many years ago, cathodic protection applications now range from home water heaters, underground pipe lines,

50 steel car wheels rough bored for grind with Kennametal clamped-on tools

An East Coast railroad shop rough bores steel car wheels efficiently and economically with Kennametal clamped-on-tip tools. The inserts are standard Style H9, Grade K3H, with modified cutting edge angles and a $3/32$ " wide x $.020$ " deep chip breaker added.

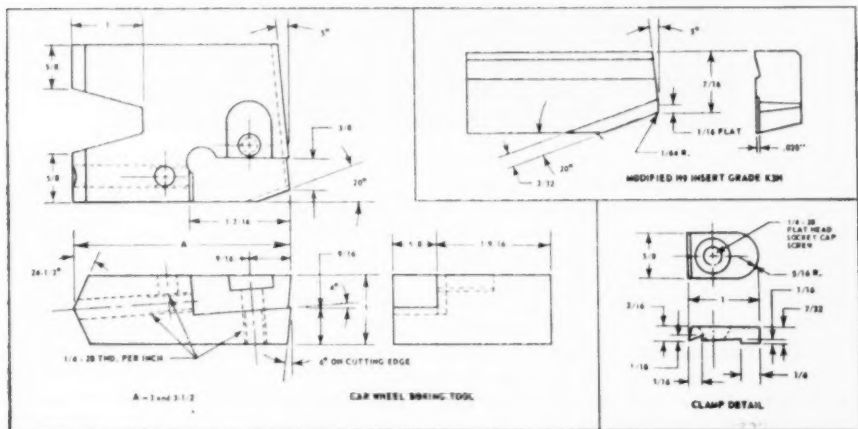
The operation is done on a Niles car wheel boring lathe with two clamped tools in a conventional boring bar. At 150 r.p.m. and $.034$ " feed an average of 75 wheels are bored per eight-hour shift.

After 50 wheels are rough bored, the Kennametal inserts are reground. Only $.010$ " stock removal per insert is required

to restore the cutting edge. This regrinding schedule assures best tool performance with extended tool life and minimized grinding wheel wear.

The clamped insert may be ground in the holder or in a jig having same rake angle as holder to give 6° clearance on cutting edges. In resharpening a tool, no part of the steel shank or holder need be ground, only the advanceable, replaceable insert.

Since 90 regrinds are available per insert, 4500 wheels are rough bored before the two inserts are replaced. Finish boring is done with high speed steel tools.



SIGOURNEY

M-100

THE PRECISION BENCH DRILLING MACHINE

ACCURATE because table and column exactly squared one to the other.

LONG LIFE because of hardened and ground spindles.

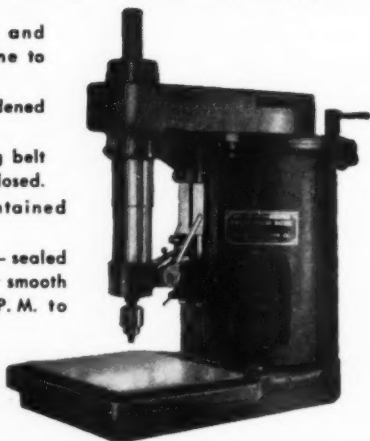
SAFE because motor, driving belt and spindles are entirely enclosed.

STRONG, RIGID for maintained accuracy.

SMOOTH AT HIGH SPEEDS — sealed ball bearings throughout for smooth operation from 4000 R. P. M. to 10,000 R. P. M.

MODELS — with 1, 2, 3 and 4 spindles.

Send for illustrated bulletin.



THE SIGOURNEY TOOL CO.

Hartford 6, Conn.

Sole Sales Agent

PRATT & WHITNEY

Division Niles - Bement - Pond Co.

West Hartford, Connecticut

1962

off shore structures and naval ships. It represents a powerful method to prevent or reduce the destructive influences of corrosion.

Foundry, Processing and Fabrication Developments

Along with the many new and improved materials developments, there has been, as would be expected, corresponding advances in foundry practice and processing and fabrication methods.

In the casting industry the development of ductile iron and shell-molding are of major importance. Ductile iron, also known as nodular iron or spheroidal graphite iron, was first introduced in 1949 and in the last year approximately 100,000 melt tons were produced. There is good reason to believe that it will become the second ranking material in foundry production, exceeded in tonnage only by gray cast iron. It gets its name from the spheroidal shapes in

There's a reason **76%***

of all popularly-priced Tool and Cutter Grinders
sold in 1952 were "*Knock-Outs*"

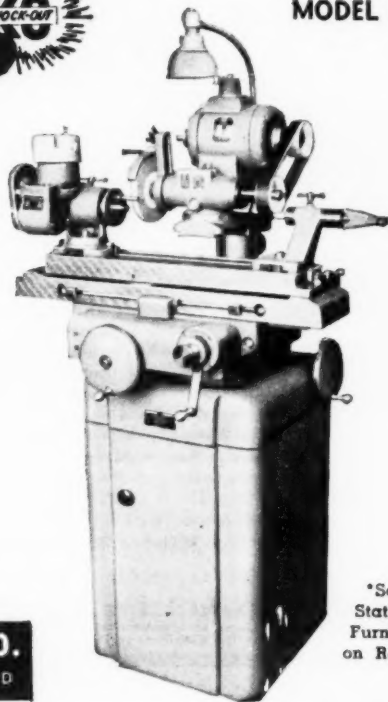


MODEL B860

Will do
anything that
machines
costing 2 or 3
times more
will do . . .
yes and in
less time.

Distributed
Only Through
Franchise
Dealers

K. O. LEE CO.
ABERDEEN, S. D.



*Sales
Statistics
Furnished
on Request

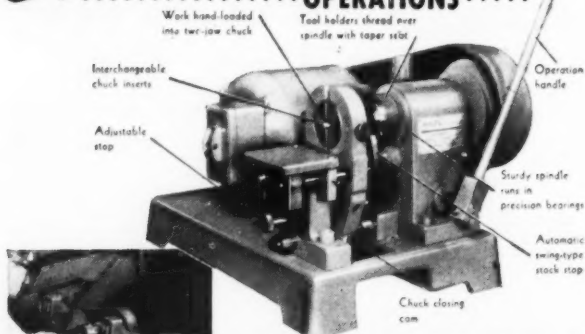
which the graphite is formed and from its relatively high ductility for a cast material. Either cerium or magnesium additions are used to accomplish this nodulizing action on the graphite. Ductile iron can be alloyed or heat treated to provide a range of microstructures and mechanical properties.

Ductile iron has excellent fluidity and ability to fill intricate molds, and the process provides better reproduction of

intricate mold details than aluminum or gray iron. It is not so susceptible to hot tearing and low casting rejection rates are the usual experience. It has successfully replaced steel, malleable iron, bronze, gray iron in many pressure casting applications at a substantial saving in cost. With respect to wear resistance, it is equivalent to or superior to gray iron, cast steel, and bronze castings and in some cases, has out-performed forged

Speeds

CHAMFERING, POINTING, FACING, REAMING OPERATIONS.....



EXCLUSIVE FEATURES OF PINES END-FINISHER SAVES TIME ON TUBE, PIPE, BAR JOBS

At Kold-Hold Mfg. Co., two Pines Air-Operated Machines with single foot control speed tube deburring and facing operations. One operator produces 1200 tube ends per hour.

Pines Portable End-Finisher is especially designed for fast, accurate work. Small and compact, its exclusive operating features save time. Forward travel of operating lever clamps and feeds work to rotating cutters in one pass. Operator always has one hand free for stock handling. Equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, grease-sealed precision bearings. Unit illustrated handles stock diameters up to 2". Maximum feed stroke is 1 1/4". Automatic air-operated units for higher production work and larger sizes up to 5" capacity are also available.

Write for Free
Bulletin



Write today for more facts. Learn how these machines are built to save time on a wide range of work.

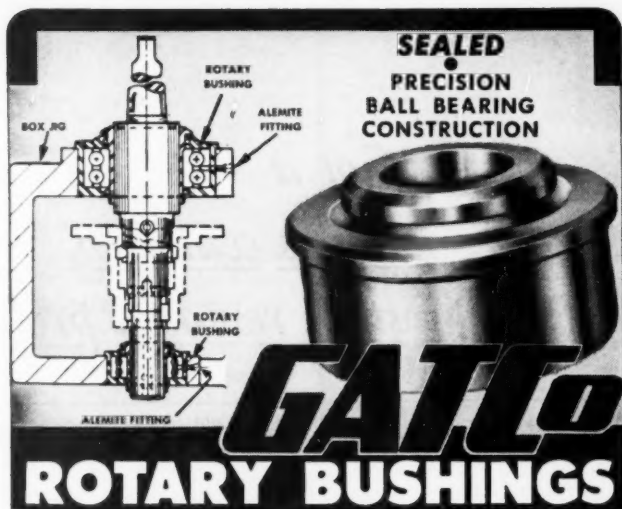
PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
BENDING · BURNING · STRAIGHTENING · THROATING · MACHINING

698 WALNUT • AURORA, ILLINOIS

steel. Its fatigue resistance is comparable to ordinary grades of steel in both the notched and unnotched conditions. It has a high yield point giving it a good strength/weight ratio. Welding and machinability characteristics are satisfactory.

The fact that ductile iron can be produced in a cupola means a low capital investment making it most attractive to foundries dealing with varied demands and small production quantities.

In view of the properties, economics of production, and applicability, it is difficult not to become enthusiastic about this development. Utilizing low sulfur compositions, it avoids the need of manganese as a neutralizer. It has been said that ductile iron process combines the process advantages of cast iron and the product advantages of steel. Its properties over lap those of gray iron, malleable iron, and steel and sometimes its utility overlaps bronze and alu-



**FOR DRILLING, CORE DRILLING,
ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.

42330 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.

Telephone PLYMOUTH 1472

minum. With its marked potential for creating new applications and new uses for foundry products, ductile iron may become the most broadly used of all foundry alloys. It is already finding extensive use as gears, crankshafts, machine parts, pressure castings, pipes, fittings, valves and numerous other applications. Over 200 foundries are now producing ductile iron in sizes ranging from a few ounces to as much as 50 tons.

Shell Moulding

Shell molding (also known as the Croning or "C" Process) fills a gap between conventional sand molding and investment casting. Basically, the process involves the formation of a thin walled, rigid, permeable mold by contacting a mixture of a plastic resin and sand binder with a hot pattern. After baking, the shells are stripped from the



*Got a
tough centerless
stock removal problem?*



*Here's the
grinding wheel
that will
absolutely solve it!*

Plant after plant is discovering that the *smartest solution to tough stock removal problems in centerless grinding is a CINCINNATI Grinding Wheel*. Because CINCINNATI Wheels go hand-in-hand with centerless grinders.

And with a Cincinnati Milling-trained machinist on the job to help you get the most out of CINCINNATI Grinding Wheels, you can count on a quick answer to that tough stock removal problem.

Why are we so sure that we can help you? Well, there are three big reasons:

1 CINCINNATI Grinding Wheels are used by—and developed by—Cincinnati Milling, which has done more re-

search, had more experience and made more centerless grinders than any other organization in the world.

2 We've solved hundreds of centerless grinding problems using CINCINNATI Grinding Wheels. These problems have not been confined to stock removal. They include a complete variety—such as roundness, taper, sizing and production.

3 CINCINNATI Grinding Wheels represent 25 years of Cincinnati Milling research and practical experience based on an entirely new approach to grinding wheels—the development of the grinding wheel as a true cutting tool.

We are so confident—so absolutely sure—that CINCINNATI Grinding Wheels can help solve your tough centerless problem that we make this *unconditional offer*:

Either you must be completely satisfied, or we will make no charge for the CINCINNATI Grinding Wheel used.

If you have a tough centerless problem, contact us at once. We'll send one of our expert machinists—men who are Cincinnati Milling-trained and know grinding and grinding machines as well as grinding wheels. He can show you how to get the most out of CINCINNATI Grinding Wheels and help you solve that tough centerless problem. There is no charge for the service of this expert machinist. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

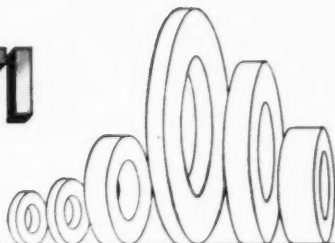
<div> <p>How CINCINNATI Grinding Wheels Solved Tough Centerless Stock Removal Problem</p> <div> <p>CASE HISTORY No. 712</p> </div> </div>	
The job	Grinding the shaft end of golf club heads.
The machine	Cincinnati No. 2 Centerless.
The problem	Stock removal. The heads come to the grinder as rough forgings (unmachined). About .040" stock must be removed and the shaft ground to a taper in one operation.
The solution	A Cincinnati 2A36-S6-VL wheel ground more than 25,000 parts — 25-30% more than any competitive wheel had produced — plus a 10% increase in parts per wheel dressing. Wheel size 20" x 2-1/2" x 12".



CINCINNATI GRINDING WHEELS are manufactured in this new, completely modern Cincinnati Milling plant.


CINCINNATI
Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.
 Cincinnati 9, Ohio





STANDARDIZE with LODDING

Jig and Fixture Components

-and Save 3 Ways!!!

Here's How:

- 1. Save at Engineering Level!**
- 2. Save Tool Room Labor!**
- 3. Save with Loding Quality!**

LODDING FIXTURE NEWS!

Loding Spring Jack records major savings. Ask for design details!





62 BEACON ST., WORCESTER 1, MASS.

THE STANDARD LINE
OF JIG AND FIXTURE COMPONENTS

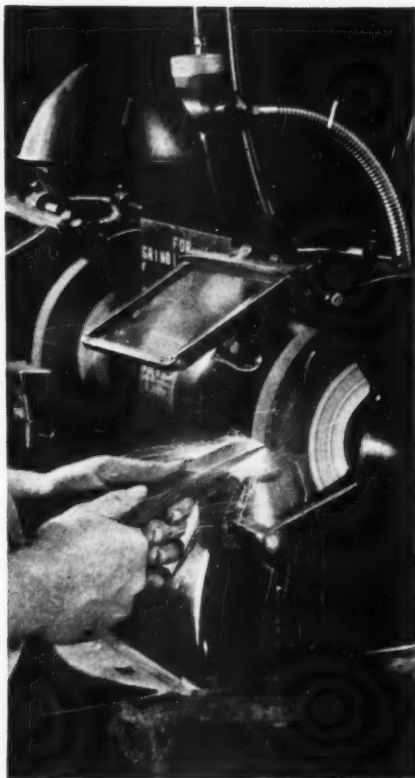
WRITE FOR CATALOG



pattern and the shell halves joined together to form a mold ready for molten metal pouring. The advantages of the shell molding process lie in its adaptability to mechanization and high production rates and the excellent surface finish and high dimensional accuracy of the cast shapes. The latter two also result in considerable savings in machining costs. Its disadvantages are the high cost of resin, the pattern equipment

and machines. It is most advantageous and economical to use where high volume production items are involved. The shell molding process is suitable for use with alloy and Stainless steels, brasses, bronze, ductile iron and recently satisfactory techniques have been worked out for magnesium which overcome the early burning troubles.

Many stainless steel shell molded parts are now in production with result-



Cut your **TOOL GRINDING** costs... with wheels *engineered for the job!*

Choose the *right* grinding wheel for *every* tool grinding job—from the complete line by CARBORUNDUM.* That's the first step toward longer cutting life for your tools... lower maintenance costs in the tool room.

Every tool room grinding wheel by CARBORUNDUM is engineered to do a specific job at the lowest possible cost. You may want faster production of cutting angles, rakes and clearances; or perhaps better finish is more important; or cooler cutting. Whatever features, or combination of features, you may require—there's a tool room grinding wheel by CARBORUNDUM that's *right* for you. Whether you're grinding high speed steel, alloy, or cemented carbide cutting tools, not only these wheels but coated abrasive belts by CARBORUNDUM can help you cut costs.

YOUR CARBORUNDUM DISTRIBUTOR or salesman is ready to help you make the right selection—why not call him today?

Two Helpful Booklets . . .

"Maintenance of Alloy and High Speed Cutting Tools" and "Grinding Cemented Carbides"—tell you more ways to cut tool room maintenance costs. They're free—ask for either or both. The Carborundum Co., Dept. B B 81-316A, Niagara Falls, New York.



CARBORUNDUM

REGISTERED TRADE MARK

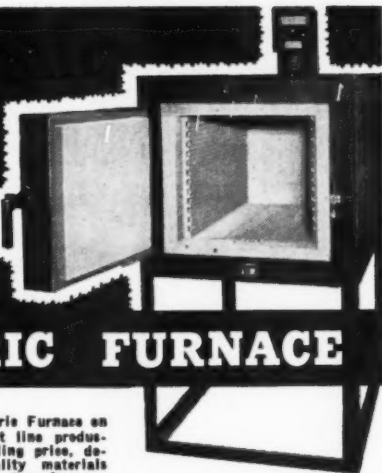
the **ONLY** source for **EVERY** abrasive product you need

81-316A

ant increase in metal yields from 20-35% and practically negligible rejection rates. Such items as pipe fittings, jet afterburner castings and impellers, are being shell molded. There are substantial savings in machining costs and for some applications 40 - 50% of final machining was eliminated. The main applications have been for small parts requiring close tolerances such as exhaust valves, camshafts, bearings, automotive parts, flanges, etc.

The future position of shell molding may be summed up as follows: shell molding can replace sand castings where quality and surface finish justifies the increased casting cost. However, the increased cost is compensated often by the reduction in finishing costs. It can compete with investment castings only when accuracy, design and finish requirements are within the capabilities of the process. In brief, shell molding is a relatively low cost precision type casting

SAVE 3 WAYS WITH ALL LUCIFER ELECTRIC FURNACE



1 SAVE with a Lucifer Electric Furnace on **FIRST COST**. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace **EVERY TIME**.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed - Lucifer controls are **EXACT**. They reach **SPECIFIED** heat rapidly and retain **SPECIFIED** temperature without variation. No special experience required when you use a Lucifer Furnace.

3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$ 467.00	\$ 548.00
9x 9x18"	647.50	784.00
12x12x24"	912.00	1068.00
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and slide loading types. Engineering advice without obligation. Write, wire or phone today.

LUCIFER FURNACES, INC.

Neshaminy 1, Pa.

Phone Hatboro 0411

Successors to Gilbert S. Simonski Company

process for large production runs.

Sejournet Process

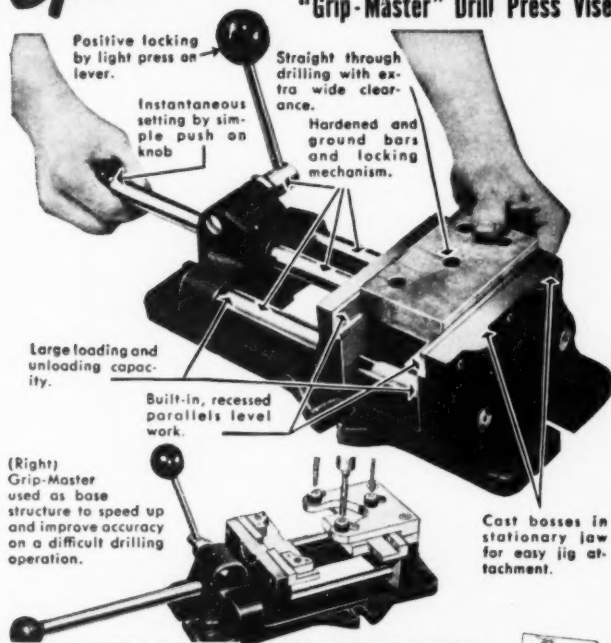
In the extrusion field, the Sejournet process involving the use of molten glass lubricants is becoming established. It has made possible the extrusion of many high temperature alloys and molybdenum alloys which were previously considered unforgeable and only could be produced in the cast condition. Billets,

bars, and tubes are now being produced on a production basis.

Summary

Thus we have seen that in order to meet the growing and increasingly severe materials demands, more and more attention and effort has been focused on what may be considered as unconventional materials. Elements which were formerly considered rare, such as the

Speed-up OPERATIONS with heinrich "Grip-Master" Drill Press Vise



(Right) Grip-Master used as base structure to speed up and improve accuracy on a difficult drilling operation.



NEW CATALOG FREE!

Be sure you have a complete Heinrich Tool Catalog in your files. Your copy will be sent free upon request.



DEPT. 103-L • RACINE, WIS.

Drill Press Vises • Fixture Locks • Nibblers
Punches • Rod Cutters

refractory metal group, are approaching engineering and production maturity. New types of strong, non-ductile materials such as the cermets, are making their bid for high temperature structural applications. While many of the developments discussed are not yet fully completed and some may be considered experimental, nevertheless their properties and potentialities hold out much promise. The trend of research and development activities toward these new

materials has in turn introduced new sets of problems. New methods of preparation, fabrication and treatment had to be evolved. Powder metallurgy and vacuum techniques had to be improved and expanded to handle production size quantities. Hot pressing, arc melting, skull melting and sheath rolling are typical of the processing improvements which resulted. Because of the extreme sensitivity of many of these materials to small amounts of impurities, vacuum

lightweight powerful

Mall

**production
boosters**

Model 1435 Electric Screwdriver. Capacity: $\frac{1}{4}$ " hex bit—No. 10 flat, No. 12 round head screws. **\$65.00**



Model 146 Electric Drill. Choice of seven speeds to meet all production requirements. Capacity: $\frac{1}{4}$ " in steel, $\frac{1}{2}$ " in wood. Top quality built throughout. **\$46.00**

• You're sure to find the EXACT MALL TOOLS you need to help BOOST PRODUCTION . . . from among the great many different styles and sizes in the MALL tool line. The name MALL on any tool you buy is your assurance of lasting dependability. Mail this coupon today.

40 Factory-Owned Service Warehouses, Coast-to-Coast, To Give You Fast, Dependable Service.

MALL TOOL COMPANY

7742 S. Chicago Ave., Chicago 19, Ill.

Send me all the facts about MALL

☐ Screwdrivers ☐ Drills

Name _____

Company _____

Address _____

MU-64

or inert gas operations were required and now may be considered almost commonplace.

Never before have the materials engineer, designer or production man had such a choice of materials to work with for any given application. Not only is there the opportunity to select any one of a group of metals e.g. aluminum, titanium, steels, but he can also turn to the field of non-metallics as a competitive choice. For any selected material a comparable variety of processing methods is also at hand. Final choice of material, of course, depends on the many factors which comprise end product evaluation. Our research scientist's have coped with the challenges of diminishing resources and improvements in properties by making available these new types of materials. In some respects a similar challenge is now laid down to designers to improve and introduce design changes centered around the characteristics of these materials. The potentialities of these and future materials developments will only be realized by the integration and coordination of components and materials from the start.

This article is from an address delivered at the first Basic Materials Conference, New York, June, 1953.

The End.

ATLANTIC GEARS



SPUR • SPIRAL • WORM
• BEVEL GEARS
GENERATED WITH
PRECISION ON
MODERN EQUIPMENT.

Send SAMPLE
or BLUEPRINT
for
QUOTATION

Call
CAnal 6-
1440

ATLANTIC

GEAR WORKS Inc.

200-MT LAFAYETTE STREET • NEW YORK 12, N. Y.



Foremanship Forum

Get Your Money's Worth Out of Those Meetings!

By **Edmund Mottershead**, President

Mottershead Associates

Chicago, Ill.

FOREMEN, supervisors, leadmen, and departmental executives in many plants are increasingly called upon to attend meetings, to discuss group and organizational problems, to learn specific applications of new policies, or to help management reach decisions.

In some instances, the number of meetings and conferences has increased to the point that supervisors say: "What, another meeting? We spend more time in meetings than we do on the floor! Why don't they let us do some work for a change?"

The fact that this attitude actually occurs is evidence of two things: the meetings themselves have been poorly conducted, and management has failed to sell foremen and supervisors on either the importance of the subject matter or the value of the sessions to the foremen themselves.

Pre-Sell the Group on the Meeting

Actually, considering the cost of salaries of the men involved, cost of a meeting room, cost of time and effort spent in preparation and in conducting the meeting, a 2-hour session for 20 men may often cost as high as \$300 and even more. Companies spend thousands of dollars preparing movies, for example, of shop operations, and end up showing the films half a dozen times to groups of 12 or 14 key employees.

The fact that management is willing to spend that kind of money, then, is the first thing to bring home to foremen and supervisors in an attempt to impress upon them the importance of what is being done.

Next, consider how much is done to sell foremen on the meetings. Is there sufficient advance notice of a session,

or are meetings seemingly called on the spur of the moment? Is the meeting part of a definite plan, one of a series which is outlined in advance so that the men who attend can see the relationship between today's session and an entire program designed to improve shop performance?

Is it easily apparent that the meeting or program of meetings, has strong support and backing from every top management? Too often, supervisory meetings appear in the guise of sessions gotten up by the personnel department or the safety engineer or someone else who really doesn't have too much status in the organization. Operating men respect the ideas and wishes of operating executives much more than those of staff people, and will have greater respect for a training program or series of conferences when obviously sponsored by the manufacturing VP than when put out under some other authority.

Finally, in management's efforts to sell a meeting or series of conferences, how much is done to relate these sessions to existing business conditions, company problems, and production needs? If the reduction in the national defense budget means reduced orders for castings and machined parts, will this result in layoffs, and if so, how will today's meeting relate to the solution of problems revolving around seniority, bumping privileges in the union contract, the merit rating program, severance pay and other matters? Or, for another example, if the company is contemplating a major change in policy which will affect not only deliveries to customers but the handling of complaints and quality standards, how will the information to be obtained in today's meeting enable foremen better to explain new quality standards to the men on the line?

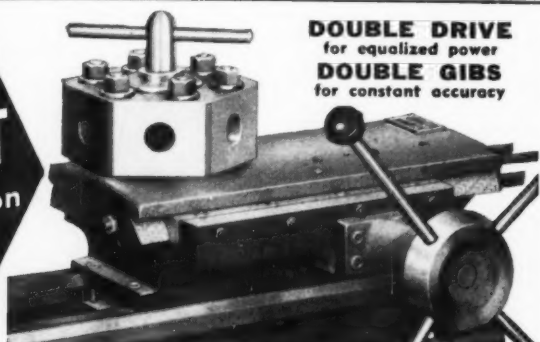
To boil it down—foremen and supervisors not only like to feel that they are being taken at least part way into

Enco Self-Indexing HEXTURRET For Lower Production Costs and Speedier Output

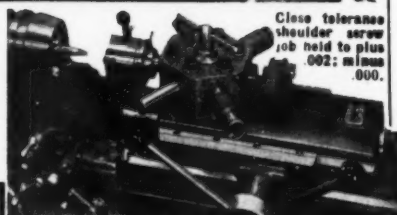
- ✓ Custom built to fit all lathes from 9" to 18".
- ✓ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.

- ✓ All bearings surfaces hand scraped.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

Manufacturers of the most complete line of HEXTURRET BED TURRETS, TURRET TOOL POSTS and TAILSTOCK TURRETS in the country. Send for Catalog No. 53.



DOUBLE DRIVE
for equalized power
DOUBLE GIBS
for constant accuracy



Close tolerance
shoulder screw
job held to plus
.002; minus
.000.

ENCO Manufacturing Co., Dept. 285

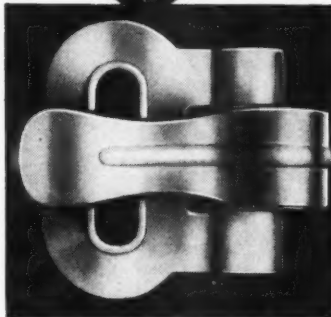
4524 W. FULLERTON AVE., CHICAGO 39, ILL.

Reasonable Deliveries



HOW B. JAHN PROGRESSIVE DIES SLASH ARCTIC BUCKLE COSTS!

Intricate dies by B. Jahn actually form and assemble 140 buckles — complete with "snap" — per minute!



DIE RIBBONS ILLUSTRATING DIRECTION OF FEED AND COMPLICATED TOOLING REQUIRED. 9 STATIONS ON EACH SIDE OF THIS PROGRESSIVE DIE TERMINATED IN A CUT-OFF AND ASSEMBLY STROKE.

The production of low cost arctic buckles represents another difficult — seemingly impossible — tooling bottleneck solved by B. Jahn design and engineering ingenuity. Not only was forming required, but permanent assembly as well — complete with spring clip locking feature incorporated into finished assembly. The inevitable result — a progressive die — production proved by B. Jahn to deliver 6720 finished buckles per

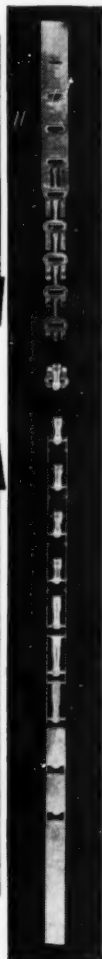
hour — all identical — each ready for assembly line use. To guarantee the die's performance in customer's equipment to his complete satisfaction, more than 25,000 buckles were submitted for gauging and assembly line use before the die was certified "Production Proved" and shipped. Not only arctic buckles, but countless components from typewriter keys to carbine clips, cameras to loudspeakers can be mass produced IN LESS TIME, AT LESS COST, TO FINER FINISHES WITH B. JAHN PROGRESSIVE DIES.



SEND NOW FOR FACTUAL, PICTORIAL BROCHURE—"The Story of B. Jahn Production Proved Dies".

B. Jahn

THE B. JAHN MANUFACTURING COMPANY • NEW BRITAIN, CONNECTICUT



management's confidence; they like to get specific and practical information and techniques they can use in their departments to make their own jobs easier and more satisfactory.

Of course, no amount of "pre-selling" of conferences or meetings can overcome the awful letdown which occurs when the men come eagerly only to attend a meeting which is poorly con-

ducted and which provides nothing of real value.

The problem of conducting an educational conference or discussion meeting where no particular **decisions** are to be reached, but where a body of information is to be presented and discussed is the problem of maintaining both group participation and group interest. This is done by having a plan, working the

FEDERAL DIAL FEED PRESSES

28 YEARS OF QUALITY CONSTRUCTION



No. 7 Dial Feed
Capacity, 80 tons

*Equal
in output—
to several standard presses!*

Often you will find a *single* Federal Dial Feed doing the work of three to five standard presses! Automatic loading and ejector mechanisms provide still further economies. Rugged, precision-built Federals are setting new highs in faster, safer, precision work — cutting down-time, reducing accidents, eliminating more expensive equipment. Finest materials and workmanship. Six to 80 tons.

Write for catalog!

THE FEDERAL PRESS COMPANY, 509 DIVISION ST., ELKHART, INDIANA

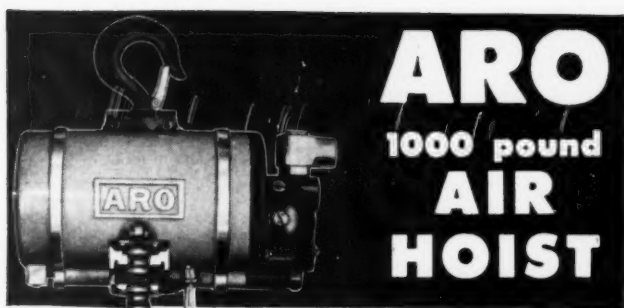
plan, and having the meeting conducted by a conference or discussion leader who knows what he is about.

Nine Steps to a Successful Conference

Each conference should have a definite objective. The leader or chairman must keep this purpose clearly in mind as he plans the conference through the nine steps outlined below. He must constantly check his progress during the meeting against that outline. The nine

steps followed in the orderly and effective handling of a discussion meeting are:

1. **State the specific subject** of the conference clearly and concisely. Make it relevant to current shop problems.
2. **Open the subject.** In introductory remarks by conference leader there should be some explanation of the subject, outline of things to be considered in the meeting, questions that will be raised.



ARO

1000 pound AIR HOIST

SPEED...

Lift rate . . .
over 40 ft. per minute!

SIZE...

Overall length 10 1/4"
weighs only 28 1/2 lbs.

SAFETY...

Betters all
safety requirements!

Write for full details.

The Aro Equipment Corporation
Bryan, Ohio

Offices in All Principal Cities

In Canada—Aro Equipment of Canada, Ltd.
Toronto, Ont.



AIR HOIST

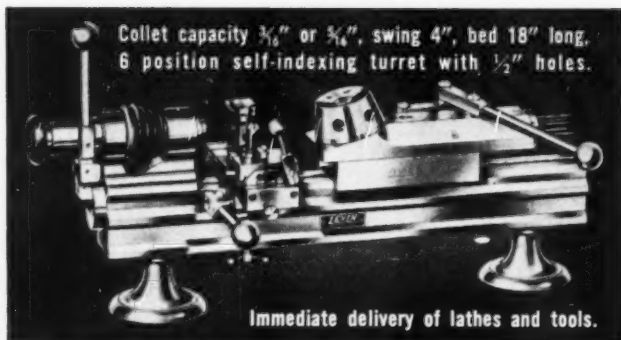
Also . . . Air Tools . . . Lubricating
Equipment . . . Aircraft Products . . .
Grease Fittings

3. **Define terms.** Draw out from the group a definition of the subject; establish a definition of terms that will be used in discussing it. Check with participants at all times to be sure there is unanimity of understanding and acceptance of terms. Use blackboard if convenient.

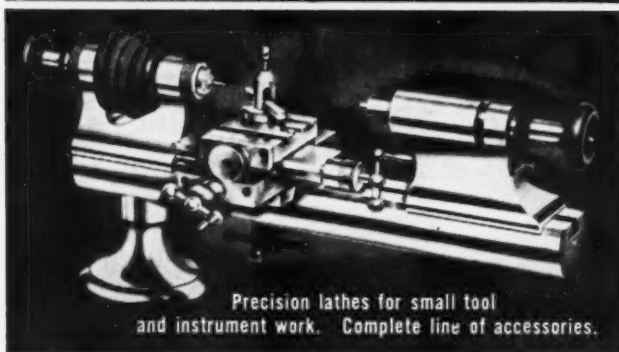
4. **Get facts and data from the group.** This is the major stage of discussion where the subject matter becomes ap-

plicable to immediate problems in each man's department. A number of devices are effective: a pro-and-con analysis may be used to bring out the advantages and disadvantages of a given course of action; a cause-and-effect analysis or a ways-and-means analysis will bring out different points; these may be used separately or in conjunction with the first method.

Other types of analysis used in de-



LEVIN® Jewelers type lathes for fine instrument work and second operations. Collets as small as .004". Send for catalog. Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21.



veloping facts and data from the group include a factor-comparison method in which factors of difference and similarity are brought out; a responsibility and lines of authority analysis; and a qualifications or requirements analysis. All of this material is drawn from the experience and current problems of group members.

5. **Selection of facts and data** to be used in reaching conclusions. Data se-

cured, usually noted on blackboard, is checked by group discussion against the basic purpose of the session. Basic question is: "Does this fact or element contribute to the purpose of this discussion?" For example, in a meeting devoted to considering ways and means of reducing tool breakage, the basic test of data would be: "Will this item help reduce tool breakage?" The bulk of the responsibility for this selection, of



Yes, We Can **Prove It!**

**You too, can get
High Speed Action on
your assembly jobs—**

Greater Accuracy • Far Lower Cost!

by Using these Modern Mechanical Helpers
DETROIT POWER SCREWDRIVERS
and
Motorized HOPPER UNITS

These popular, advanced machines offer a fast, dependable method of assembly definitely proved indispensable in other plants . . . In replacing slow, tedious manual handling, it has boosted production substantially, sustaining uniform results by eliminating human error . . . Whatever your feeding and assembling operations may be, our engineering experts will analyze your problem and come up with a practical solution . . . Give us details . . . Send sample assembly.



DETROIT POWER SCREWDRIVER CO.

2809 W. FORT ST.

DETROIT 16, MICHIGAN

THE Di-Profiler

RECIPROCATING HAND MACHINE

Pat. Pend.

**Saves You Hours
On Intricate Jobs**



Internal holes
and
irregular dies



Convex or
concave surfaces



Tool edges



Internal or
external tapers



Shoulders
and recesses

The Di-Profiler is indispensable for die, tool and mold work.

... Far superior to manual operation, it is used for finishing straight or curved surfaces, small holes, dies, molds, regular or irregular drawing dies, reworking hardened material and for many other similar jobs.

Light — Fast — Precise Variable Speed and Stroke

The Di-Profiler has a controlled stroke variable from 0 to 6 mm ($\frac{1}{4}$ inch), and a speed of reciprocation that can be varied from 0 to 100 strokes per second. It is simple in construction, free from vibration, weighs less than one pound, and is accurately and easily controlled during operation.

**For Complete Information Write For
New Technique Folder M-1153**

ENGIS EQUIPMENT COMPANY

431 South Dearborn Street, Chicago 3, Illinois

course, rests upon the discussion leader; but the final result will develop as the product of the joint effort of the group.

6. Evaluation of facts selected. This is commonly done by listing them in order of importance, and offers a further opportunity to narrow the group's thinking into specific channels which can bring about some useful conclusions.

7. Arriving at a group decision or conclusion. . . by the group . . . as to the best solution to the problem, the best

general policy to adopt on the subject discussed. Build from the statements and recommendations of the members of the group. Remember that the primary purpose of such a meeting is educational, for mutual understanding. It is important that the chairman make sure each member of the group understand and appreciate the final conclusion and see how it may be applied in his own department.

8. Planning to make the conclusion



Large Capacity Feeding of Small Parts with *SYNTRON* PARTS FEEDERS

- Fully Automatic
- Parts Fed Single File in Oriented Position
- Rheostat Controlled

Provide accurate high speed handling of small parts to automatic machines and continuous processing equipment. Electromagnetic operation — Compact, easy to install, low cost.

Write for **FREE**
Catalogue Data

SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

effective. Develop from the suggestions of the group a plan that will be workable as a means of implementing the policy or action agreed upon.

9. **Summarizing the conference.** In addition to the final summary by the conference leader or chairman, at the end of the conference, occasional but not too frequent summaries by the leader during the conference discussion are helpful in pointing out progress in discussion, the "where we are going and where we are" idea. The final summary should review briefly the purpose of the meeting, high-light the discussion and point out how the final conclusions

fulfilled the purpose set for the meeting.

The basic value of the conference method lies in the fact that when a group of men have sat down together and thought through a mutual problem and reached a conclusion in their own minds by mutual agreement, they will naturally do a better job of carrying out the responsibilities which that conclusion entails.

Thus meetings become worth while instead of time-wasting in the minds of foremen and supervisors participating, and management gets its money's worth too.

The End.

**FOOLPROOF
AIRETEST
INDICATOR
IDENTICAL
READINGS
From Any
DIRECTION**

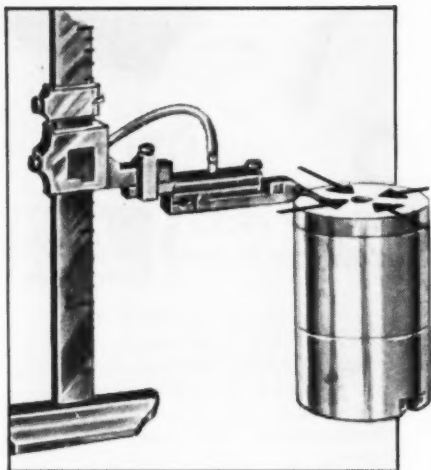


NO HYSTERESIS*

**1,000, 2,000, 5,000
and 10,000 Amp.**

You can approach any desired point on the work part "head on," from either side, or you can back the stylus across it. You get precisely the same gage reading every time. Gage Division, The Sheffield Corporation, Dayton 1, Ohio, U. S. A.

ASK FOR DEMONSTRATION



*HYSTERESIS:—LOST MOTION

6338



SHEFFIELD

**A special report
by the editors of
MACHINE and TOOL
BLUE BOOK**

Report number 35

Grinding Machines . . . part 9

This is the thirty-fifth in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on grinding machines are:

1. Optical grinding.
2. Descriptions of late model grinding machines.
3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5. Milling Machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula; 9, 10. Chucking Machines, Turret Lathes, Hand Screw Machines; 11. Broaching Machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers; 17. Gear Making Machines; 18, 19. Boring Machines; 20, 21, 22, 23, 24, 25, 26. Drilling Machines; 27, 28, 29, 30, 31, 32, 33, 34. Grinding Machines.

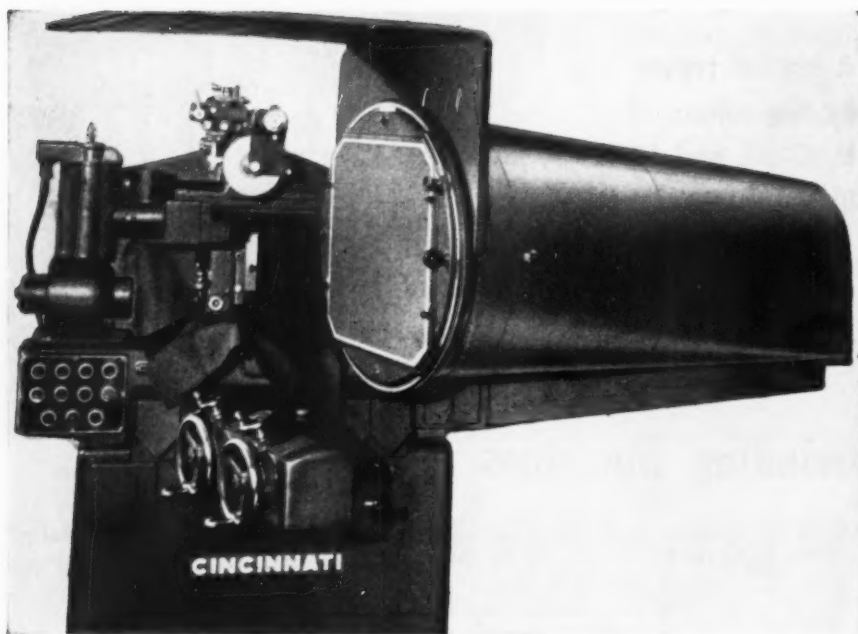
Optical Grinding

GAINING STEADILY in popularity are the optical projection grinding machines. Such machines were designed specifically for the grinding of extremely accurate small profile shapes such as those required by formed carbide cutter tips, lamination dies, templates, masters for profiling operations, and flat or circular form tools.

An example of this type machine is shown in figure 1, a Projecto-Form grinder made by the Cincinnati Milling

Machine Co., Cincinnati, Ohio, under license from the Weldon Tool Co., Cleveland, Ohio. (Other machines of similar types are discussed at the end of this article.)

Optical grinders provide an optically enlarged image of the work which may be compared, while grinding progresses, with a previously prepared, enlarged scale "master" drawing, figure 2. The method of obtaining an optically enlarged image of the work is shown dia-

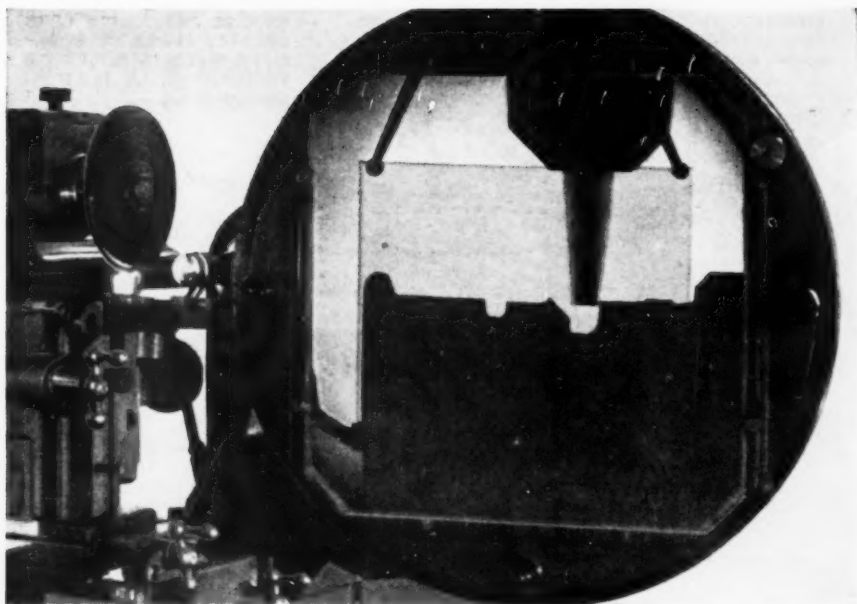


1. A front view of the Cincinnati Projecto-Form grinding machine.

grammatically in figure 3. A lamphouse, shown in the drawing as the powerful concentrated light source, houses a powerful, concentrated bulb and a set of condenser lenses. These latter tend to concentrate the light and focus a brilliant flood of parallel rays of light across the uppermost edge of the workpiece. On the opposite side of the workpiece, and having the workpiece in its plane of focus, is an extremely precise optical projection lens system which throws a greatly magnified silhouette image of the work profile on a ground glass viewing screen. The rays of light, originating in the lamphouse and passing through the projection lens, are reflected back toward the operator by an optically flat mirror to create an upright, non-transposed image of the workpiece

which corresponds exactly to the work profile as viewed from the operating position. The workpiece remains stationary, and its image in sharp focus on the viewing screen, even during the progress of the grinding operation. The projection unit is completely housed within a light-proof optical tunnel to maintain a brilliant image on the viewing screen without dilution by the normal room light. The workpiece is ground by comparing its image on the viewing screen with a translucent, "bright line" master drawing mounted directly behind, and in contact with, the screen.

The fundamental advantage of the optical projection type of machine is the speed and ease with which it will produce small, profile-ground shapes of extreme accuracy. It accomplishes,



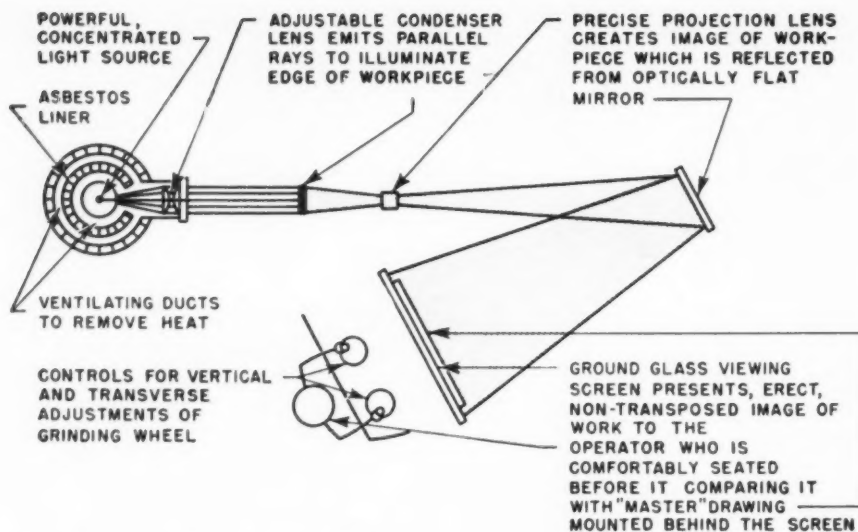
2. A typical job as seen from the operating position. Note the ease with which the optically enlarged image of the work can be observed as the grinding operation progresses.

simultaneously, the dual purpose of profile grinding machine and optical comparator to permit continuous enlarged comparison of the work profile with the "master" drawing, as the grinding operation progresses. The convenient location of operating controls and type of optical projection employed make these machines easy to operate. Their operation involves very little eye strain or muscular fatigue to observe an enlarged shadow image, sharply and brilliantly outlined on a shielded ground glass viewing screen, directly in front of an operator who is comfortably seated before it.

The desired profile is preferably made on a glass plate, coated on one side with a green-tinted translucent emulsion. By accurately cutting away the emulsion, a bright line of the desired profile can be clearly seen on

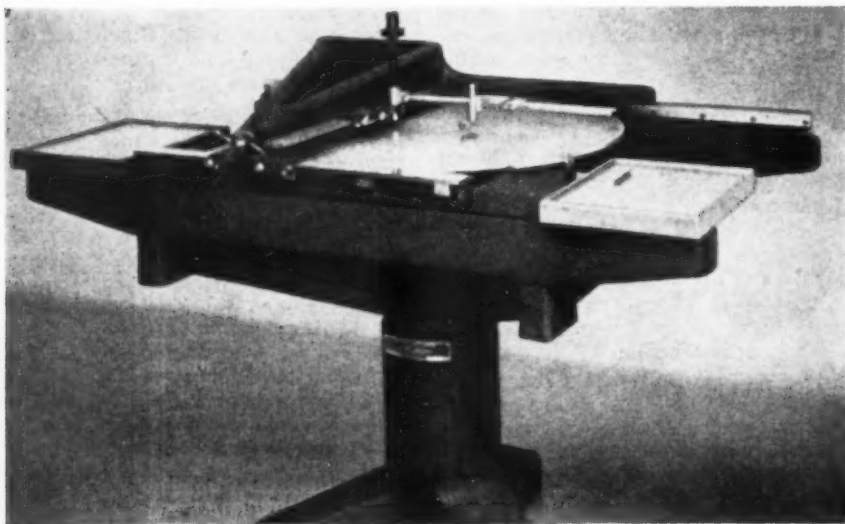
the viewing screen in contrast with the dark projected shadow of the work. Such machines as the Cincinnati layout scribing machine, figure 4, are ideal for making these profiles.

This machine is essentially a super-precise drawing device for the preparation of extremely accurate "master" drawings. Lines are scribed in the emulsion-coated glass plate by means of a carbide-tipped stylus which cuts an accurately uniform width of line (normally .004" wide, which, at 20 to 1 magnification ratio, represents 0.0002" on the workpiece). The scriber is mounted in a holder which may be shifted longitudinally or transversely with a high degree of accuracy. A tram-mel bar, or beam compass type of arrangement, provides a means for scribing circular arcs. Accurate positioning of the scriber is assured by longitudinal



3. Schematic diagram of optical system.

4. **Layout scribing** machine provides means of making master drawings on a scale of 20 to 1 and accurate to .001". The massive construction of the layout scribing machine provides the rigidity necessary for extremely precise work.



**"BEST BUY ...
the boss ever made!"**

LEACH 6 X 12 SURFACE GRINDER

**HIGH OUTPUT
at LOW COST**

Don't let the low price fool you! The Leach 6 x 12 Surface Grinder is an entirely new engineering triumph that does the BIG jobs. Easily and accurately handles 90% of the work of far more expensive machines. A proven giant money-saver by hundreds of enthusiastic owners. Completely self-contained . . . 2-speed ball bearing spindle, driven by a $\frac{3}{4}$ HP motor. Nowhere else can you get such high output at such low cost! Write for detailed description.



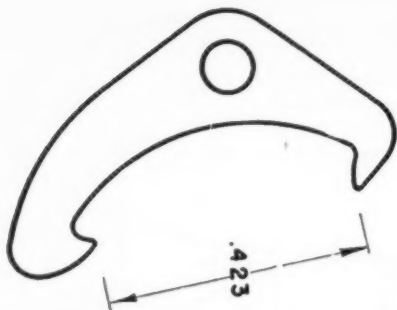
H. LEACH MACHINERY CO.

387 CHARLES STREET

PROVIDENCE 4, R. I., U. S. A.

WORLD DISTRIBUTORS

DEALERS IN PRINCIPAL CITIES

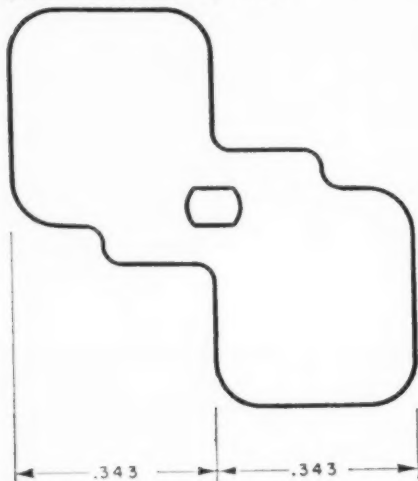


5. **Entire contour** of blanking punch for this part was ground by the Projecto-Form method. Time was reduced by 68%.

and transverse graduated scales, equipped with verniers reading to one-thousandth of an inch, and trammel bar is similarly equipped for accurate selection of desired radii.

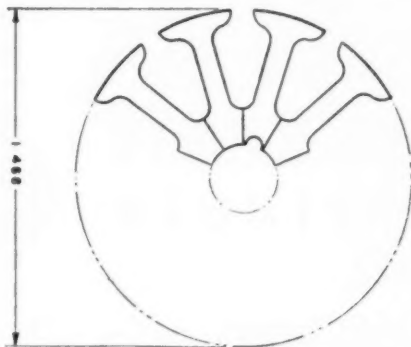
Many advantages are the result of using optical projection. Toolmakers have been quick to realize the advantages of being able to see an enlarged view of the work piece while the grind-

6. **Optical grinding** is well suited to the grinding of small gages and templates. Grinding time on this hardened steel template was reduced by 72%.



ing operation progresses. This is particularly true of small work pieces like the punch for the part shown in figure 5. The entire contour was ground. The variety of work in the average tool or die shop usually includes the making of templates of many sizes and descriptions. The grinding of small templates is another class of work well suited to the optical grinders as illustrated by the fact that the grinding time for the hardened template shown in figure 6 was reduced by 72%.

Lamination dies like the one shown in



7. **Profiles** on sections of the die for this armature lamination were ground with a wheel crush dressed to shape. Crush dresser roll was ground on optical projection grinder in three hours by using the circular grinding attachment which is also used to grind circular form tools.

figure 7 are usually built up of a number of identical sections. It is interesting to note that the profile was produced by a grinding wheel formed to the correct profile by a crush dresser roll ground on an optical projection grinding machine. When grinding work pieces requiring rotation, such as crush dresser rolls or circular form tools, a circular grinding attachment, such as figure 8, is used on the machine.

Circular form tools are being ground on the Projecto-Form machine by the



Little Grinder with Big Ideas

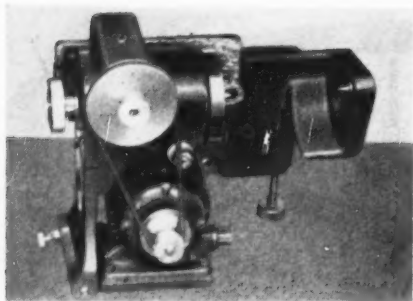
Give your toolmakers the grinder that's big enough for most toolroom jobs. Abrasive No. 1½ takes work up to 15" long x 10" wide x 12" high — 150 sq. in. of table working surface! Nearly 50% more than most small surface grinders. Work produced on this grinder satisfies every requirement for accuracy, fine finish, and flatness. This is a

precision tool of extremely simple design — a popular tool wherever one-of-a-kind jobs have to be ground fast, efficiently, and with a minimum of fuss and bother. Send for catalog describing Abrasive No. 1½ Surface Grinder. Abrasive Machine Tool Company 14 Dunellen Road, East Providence 14, Rhode Island.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

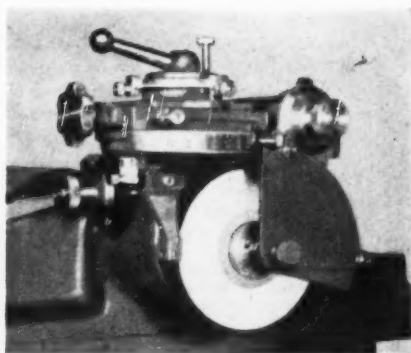
Abrasive Quality is Reflected in the Finish of Your Product



8. This is a circular grinding attachment for circular form tools from $\frac{1}{2}$ " maximum concave to $\frac{1}{2}$ " maximum convex.

Weldon Tool Co., using an attachment they make themselves. The fixture is mounted on the face of the work-holding platen. The work is mounted on a short arbor and rotated between centers by a gear drive from a separate motor. Speed of work rotation can be varied by changing the gears.

When grinding flat work on this type machine, the wheel is reciprocated. When grinding circular work it is not. Parts about $3\frac{1}{2}$ " in diameter or less are rotated at about 30 r.p.m. for both roughing and finishing operations. For

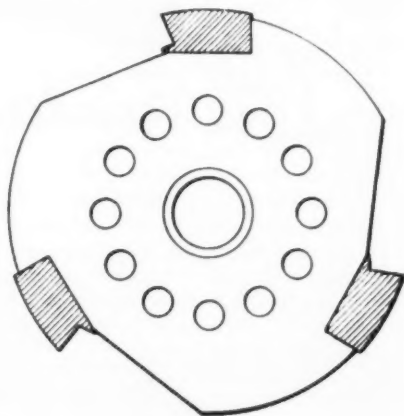
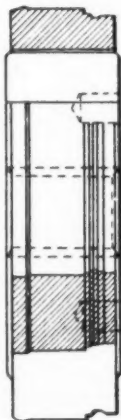


10. Attachment for truing radii and angles tangent to radii. Diamond truing type. Range $\frac{1}{2}$ " maximum concave to $\frac{1}{2}$ " maximum convex.

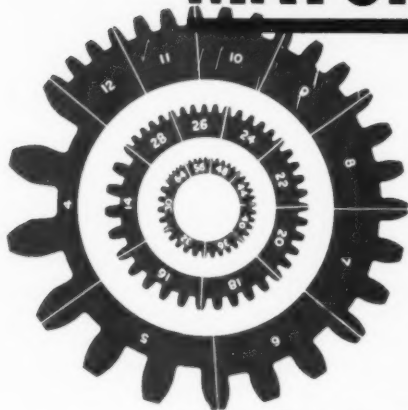
both roughing and finishing, larger diameter parts are rotated more slowly. A typical carbide-tipped circular form tool, figure 9, is ground to shape from solid carbide blocks which have been brazed to the steel body of the tool. The tool is rotated at 50 r.p.m. for rough grinding and at 30 r.p.m. for finishing. Rotation of such tools does not prevent a clear image from being projected on the screen.

The optical projection machine such

9. An optical projection machine is used to grind the tips of the circular form tool shown here, from solid carbide blocks which have been brazed to the steel body of the tool. It is rotated at 50 r.p.m. for rough grinding and at 30 r.p.m. for finishing.



MATCHED TOOLING for your GEAR LINE



At Michigan Tool, gear cutting and finishing tools for the same gear are **MATCHED**—matched to each other, matched in performance.

Matched tooling means greater assurance of accuracy throughout the life of tools. It means more gears per tool and lower tool cost per gear.

When your tools are *Matched*, they work in harmony, each with the other.

Michigan Matched gear cutting tools include ground and accurate unground hobs, shaper cutters, Shear-Speed cutting tools, gear finishing cutters or racks, also gear laps.

Michigan's own laboratory control of the high speed steels and heat treatment of the high speed steel tools assures the users of consistent highest quality in his *Matched* gear tools.

Insist on *Michigan Matched Gear Tools* for your gear production line.

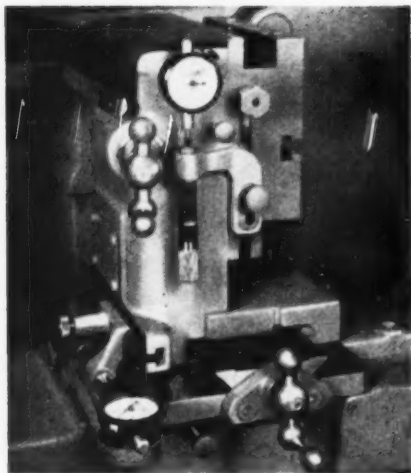
GEAR PRODUCTION HEADQUARTERS



MICHIGAN TOOL Company



7171 E. McNICHOLS RD. • DETROIT 12, MICHIGAN, U. S. A.



11. Precision measuring equipment for accurate adjustments of transverse and vertical work support slides. Consists of an adjustable micrometer barrel support bracket and dial indicator for each slide.

as the Projecto-Form is necessarily a dry grinding machine. Because of the optical system built into the grinder, applying coolant to the grinding wheel would result in inefficient operation since the condenser lens would fog up because of flying metal particles and pieces of abrasives, especially if the work piece were steel.

Descriptions of late model surface grinding machines

Sanford model MG

The Sanford MG micro grinder, for wet or dry grinding, handles large work as well as small intricate jobs. The MG grinds to micro inches, is sturdy, well constructed and has excep-

tional sensitivity of control. Transverse ways are double vee meehanite inserts. Antifriction bearings are used wherever possible. All slides and bearings are carefully protected to exclude dust and grit. Castings are specially heat treated to insure dimensional stability. Feed screw threads are machined to strictest tolerances. The table working surface is 5 $\frac{1}{2}$ "x12 $\frac{1}{4}$ ". Tee slots for standard $\frac{3}{4}$ " tee bolts will take 5"x10" or 6"x12" magnetic chuck. The grinder is made by Sanford Mfg. Corp., Union, New Jersey.



Cleveland visual grinding machine

The visual grinding machine has been developed to meet the demand for accurate surface form grinding in both large and small tool room operations. The precision optical system with selected matched lenses deliver a true-ness and definition equal to those of finest inspection equipment. Savings are effected in diamond and abrasive



POP'S School of Filing



The "language of files and filing" is a necessary part of every good mechanic's education—whether he is "majoring" in a specialized type of operation or is assigned to miscellaneous work around the shop. The days of haphazard file selection and filing techniques are gone in modern shop practices. Parts finishing, assembling and fitting must take into account diversity of metals, degree of accuracy—and the speed necessary to keep production costs within bounds.

Nicholson file engineers study these factors and design files with tooth shapes, angles, sharpness and hardness to fit specific metals, methods and end results. With Nicholson, making files is a science.

If your industrial distributor handles Nicholson or Black Diamond brand files, he is well equipped to give your production heads helpful technical suggestions.

ABOVE—The Nicholson (or Black Diamond) Long Angle Lathe File. While the ordinary Mill file is normally capable of doing good lathe filing, the Long Angle Lathe file—with teeth angle increased to 45°—does faster and smoother work. The chips slide down the longer angle and there is less tendency of "pinning up" and scratching surface being smoothed.

Free book, "File Philosophy"

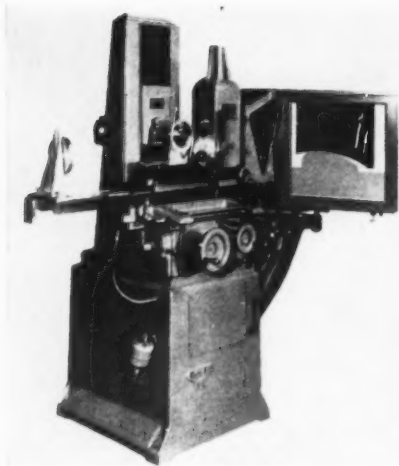


NICHOLSON FILE CO. • 16 Acorn St., Providence 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



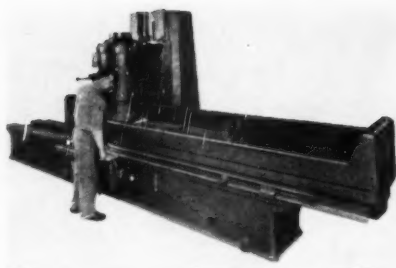
NICHOLSON FILES FOR EVERY PURPOSE



wheel costs by the ability to grind numerous forms while using only a few select wheels. When the machine is in operation a powerful light back of the piece being ground projects a shadow enlargement on a ground glass viewer. The silhouette, or shadow, can be enlarged either 20 or 50 times, permitting the operator to actually "see" the work. On the viewer, .001" is stepped up to .050", almost a sixteenth of an inch. The machine is made by the Cleveland Grinding Machine Co., Cleveland 12, Ohio.

Hill openside hydraulic surface grinders

These heavy duty hydraulic surface grinders, made by the Hill Acme Co., Cleveland 2, Ohio, are manufactured in two types: horizontal and vertical spindle. They are ideal machines for single purpose grinding, production operations or general utility tools. All machines are equipped with hydraulic table drive which reciprocates at extremely low pressure through two opposing pistons, resulting in smooth, positive operation. Table speeds are instantly variable from 10 to 100 feet per minute. Among other features are:



built-in spindle motor; ways fully protected; centralized controls; open side convenience; no table overhang.

Leach surface grinder

This grinder, made by H. Leach Machinery Co., Providence 4, R.I., is designed of heavily ribbed cast iron (normalized to relieve all stress) and mounted on a sturdy box-type welded steel base to fill the demand for close tolerance and fine finish. The machine is hand scraped. The table and saddle feed shafts are mounted in permanent Oilite bearings while the vertical feed



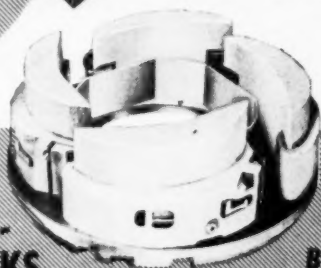


IMPROVED GRINDING ACTION
By AUTOMATIC CHIP ELIMINATION

Tested—Approved
For Vertical Spindle
Surface Grinding

For Horizontal Spindle
Face Grinding

For Knife Grinding



ABRASIVE
ASSOCIATES...
SEGMENTAL GRINDING CHUCKS

and AA1
SEGMENTS
By Licensees

For MAXIMUM RESULTS . . . AT LOWEST COSTS

Here's an entirely new grinding principle . . . one that has repeatedly proved itself on the full range of surfaces and materials to be far superior to other methods, yet slashes costs. As illustrated, the patented AA1 Grinding Segments are placed in circular echelon formation in the patented chuck, thus cutting with sweeping action, automatically eliminating chips and debris from the cutting path of the segments. This drastically reduces "loading." **Segments are always at top cutting efficiency.** Constant free cutting reduces heat, warpage accidents and dressings required and produces flatter surfaces, finer finishes with faster grinding. The operator **always** has a clear view of the work being ground, and is able to change or re-adjust segments in a fraction of former time. The AA1 Segment—used on chucks from 15" to 60" diameter assures the lowest cost per cubic inch of usable abrasive and less "Downtime" for changing segments. Get the complete facts in a well illustrated brochure. It's yours for the asking. Write today.

from 15" DIAMETER TO 60" with
ONE SIZE and SHAPE SEGMENT, AA1

STYLE	STYLE	STYLE	STYLE	STYLE	STYLE	STYLE	STYLE
AA	B	C	D	E	F	G	R-W
\$13.11	\$15.60	\$15.66	\$16.10	\$16.46	\$17.20	\$18.38	\$21.70



MAXIMUM RESULTS . . . possible with the AA1 Segment from minimum abrasive material. Diagram shows the lower cost per usable cu. in. of abrasive material when purchased in the form of the AA1 Segment compared with other segments or a ring wheel. Red shows the unnecessary expenditure—the money saved by the use of **AA CHUCKS and SEGMENTS**. As indicated, 100 cubic inches of usable **ABRASIVE MATERIAL** costs \$21.70 in a Ring Wheel, while the same 100 cu. in. cost only \$13.11 in the AA1 Segment shape or \$8.59 less. All comparisons are original standard list prices, subject to discounts.

ABRASIVE
ASSOCIATES

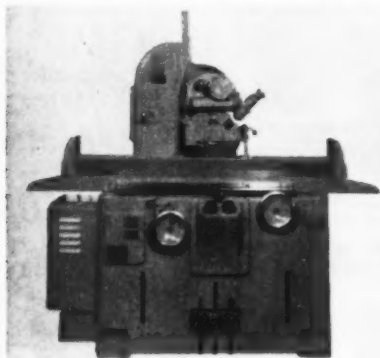
280 SHEPARD AVE., HARTFORD, CONN.

Dedicated to BETTER GRINDING FOR INDUSTRY

screw is ball bearing mounted. Ways are lubricated by oil cups and constantly covered for dust and grit protection. The integrally built way guards and one piece rigid vertical way guards give continuous trouble-free operation. Spindle is mounted in precision type ball bearings.

Thompson surface grinders

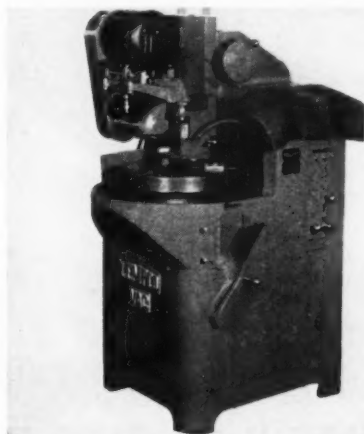
On these surface grinders a table feed of one hundred feet per minute permits the use of harder wheels and makes possible the production of finishes which were formerly only obtainable after the expenditure of time and patience. The new type grinding wheels built for this operation are of open and free cutting construction. The result is a fast, cool cutting operation which causes less distortion in the



work, as lighter cuts may be taken at high speed. The Hydraulic cross feed is smooth and easily variable up to one-half the wheel face, or more, if required. Mounting the motor directly on the grinding spindle has accomplished more than the elimination of the maintenance of indirect drives. The full power of a standard motor built with precision is now available and produces a drive which is trouble-free and vibrationless. The grinders are made by the Thompson Grinder Co., Springfield, Ohio.

Lempco vertical turning or grinding machine

The Lempco vertical turning and grinding machine, made by Lempco Products, Inc., Bedford, Ohio, is primarily suited for turning and grinding large flat surfaces (for example, grinding large dies). However, any number of different mechanical devices may be fastened to the vertical cross slide after removing the standard equipment



shown on the machine. Various grinding spindles with cylindrical, face or cup type wheels may be attached. Similarly, single or multiple point tools fixed or slideably mounted may be used. A turret may be mounted either offset or on the centerline of the table, or both, as is common practice on turret lathes. Any combination of these elements or any special tooling setup (such as automatic tapping heads) may be mounted as the needs of the job dictate.

Taft-Peirce 6" rotary surface grinder

Among the features of this machine are the tilting wheelhead, which makes it suitable for difficult angle and shoulder work, and the specially designed Taft-Peirce Superpower Magnetic Rotary Chuck which permits hold-



How to **KO** high costs...

... SWITCH TO CIMCOOL®, the radically new and different cutting fluid that's hailed as one of the "finds" of the century. This revolutionary cutting fluid—this *chemical emulsion*—is always a winner, because it does a *better job* while saving money three important ways:

CIMCOOL INCREASES TOOL LIFE (and thus reduces down time) because of its chemical lubricity.

FASTER SPEEDS are possible because Cimcool cools faster, through a unique physical change in the coolant itself. Tools and chips actually stay cool to the touch.

CIMCOOL COSTS LESS than old-fashioned cutting fluids because it lasts longer. It also cuts labor costs for cleaning and changing. It virtually eliminates rancidity and foul

odors. And because of its low surface tension and low adhesion to work and chips, there is practically no carry off.

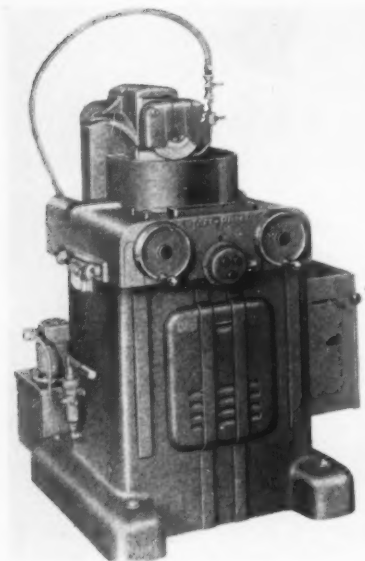
If you'd like to see CIMCOOL's one-two-three punch for yourself, ask for a demonstration. Just write us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet "Cimcool Defeats Heat." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

©Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

for 85%
of all metal cutting jobs

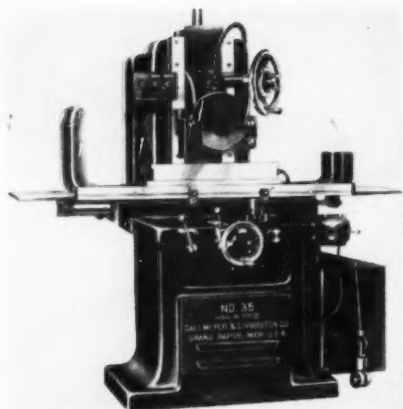
A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



ing small workpieces in the center of the faceplate. The work spindle is supported in a trunnion mounting which permits swiveling the chuck forward or to the rear through a $7\frac{1}{2}^\circ$ angle. This facilitates the accurate grinding of saws, cutters, gear shaper cutters, and similar small tools and parts. The machine is made by Taft-Peirce Mfg. Co., Woonsocket, R.I.

No. 35 Gallmeyer & Livingston

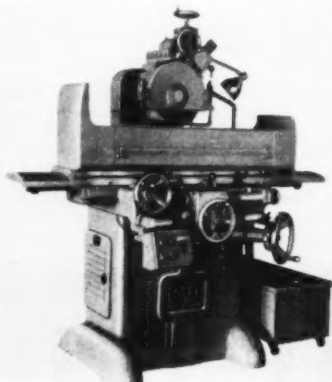
Both the longitudinal table travel and the cross feed are hydraulically actuated, with the wide flexibility which this type of movement makes possible. In the case of the No. 25 machine a maximum longitudinal table speed in excess of 80 feet per minute, and in the case of the larger machines a maximum speed in excess of 115 feet per minute is possible. Table speed is variable and practically any desired speed up to the maximum is instantly obtainable. The cross feed of the machine is automatically operated and is set so



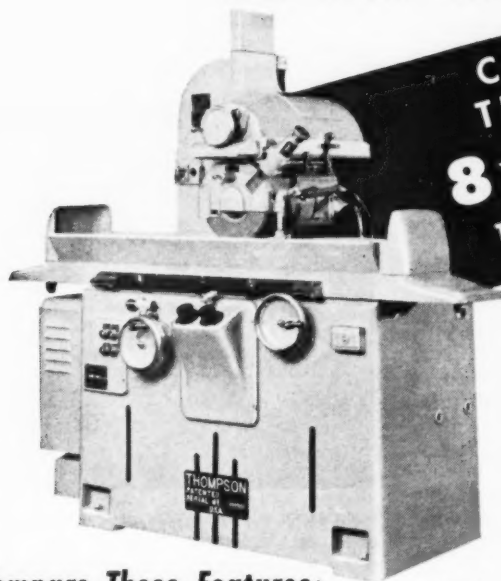
as to operate at each reversal of the reciprocating table. The amount of cross feed ranging from .012" to .125" is adjustable and can be set to feed either in or out, as desired. Two usable spindle speeds are provided through a vee-belt drive to the grinding wheel spindle from motor mounted on an adjustable bracket attached to the head of the machine. This unit is made by Gallmeyer & Livingston Co., Grand Rapids 2, Mich.

No. 35 Covell surface grinder

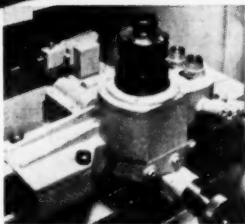
A high table speed, 90 ft. per min., is one feature of this Model 35 surface grinder, made by Covell Mfg. Co., Ben-



Thompson Type 2F SUPER PRECISION Tool Room Grinder



COMPARE
THIS NEW
8x10x24
TOOL ROOM GRINDER
(Write for specifications)



MAGNIFIED TEMPLATE DIAMOND WHEEL DRESSER with ten to one magnification available in universal manually operated and electric. Other auxiliary Thompson Type 2F equipment includes "Coolant Thru the Wheel" feature and Magnetic Chucks with control.

Compare These Features:

- HARDENED AND GROUND cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
- HARDENED AND GROUND sealed anti-friction vertical slide.
- HARDENED AND GROUND BED WAYS with automatic lubrication.
- 5600 1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.

- Handy control panel.
- Elevation micrometer stop graduated in .0001".
- GROUND THREAD FEED SCREW.
- Automatic wheel TRUING device.
- Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 10, Thompson Grinder Co., Springfield, Ohio.

◆ The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

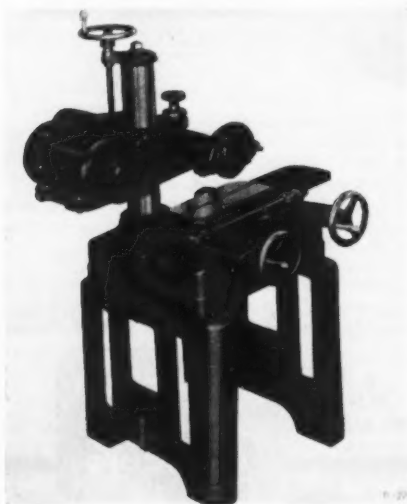
Thompson
SURFACE
Grinders

The Thompson Grinder Company, Springfield, Ohio

ton Harbor, Mich. Ways are of generous proportions and carefully hand scraped. Vertical ways are cast integral with base and are scraped and aligned with saddle ways. All castings are semi-steel, rough machined, normalized, then finished. The three speed spindle is easily changed to give proper peripheral speeds for the grinding wheel even after it has been worn down. Automatic lubrication is supplied to all bearing surfaces. Sealed-for-life spindle, quill type, is vee belt driven by a standard motor. Antifriction ball or roller bearings are used throughout.

Delta surface grinder

The spindle on this machine is designed to preserve accuracy. The wheel is clamped into the two-piece adapter mounted on the spindle. Rapid vertical adjustment is made by means of large handwheel at top of column. Close adjustments are made with micrometer screw. The wheel adapter saves time on truing-up operations. Complete wheel and adapter can be removed as a unit and replaced without further truing-up. The column is cast of high tensile steel. The table is smooth, has



long ways for solidity and provided with gibbs to adjust for wear. The machine is made by Delta Power Tool Div., Rockwell Mfg. Co., Pittsburgh, Pa.

Sheffield Micro-Form grinder

These precision grinders are designed to finish grind most accurately every desired profile within their range, directly from the drawing. They are especially suited for the grinding of both circular and flat form tools, templates, profile gages, cams, dies, etc. Machine is not limited by the regularity or ir-



regularity of the work, nor by straight lines or irregular curves. The machine grinds directly from the drawing, entirely eliminating the need for templates or masters. The work can be checked without removing from the machine. Because of the 30 power viewing screen or scope and the 50 to 1 pantograph, checking time is greatly reduced. The grinder is made by the Sheffield Corp., Dayton 1, Ohio.

Cincinnati Projecto-Form grinder

The machine accomplishes, simultaneously, the dual purpose of profile grinding machine and optical comparator to permit continuous enlarged comparison of the work profile with the "master" drawing, as the grinding



operation progresses. Some of the features: projected image corresponds to work profile with a high degree of geometrical precision; lamphouse focuses a brilliant beam of light across work profile; wheelhead swivels in two planes for grinding clearance angles; longitudinal, transverse, vertical, and rotative positioning of work support platen; lamp position and condenser lens system independently adjustable; wheelhead slide reciprocation infinitely and independently adjustable in both directions; automatic lubrication of wheelhead reciprocating ways, oil shot and both types for other important bearings. Machine is made by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Crystal Lake surface grinder

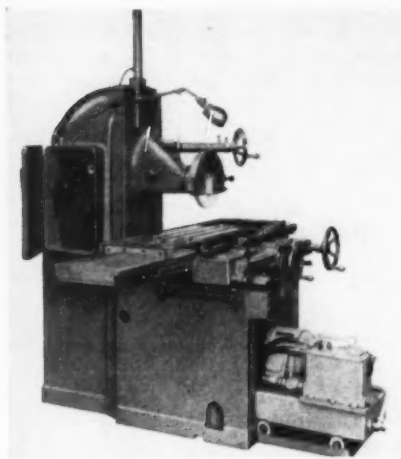
This grinder, made by Crystal Lake Grinders, Crystal Lake, Ill., was designed for grinding hard materials such as sapphire, carbides and hard alloy steels where a fine finish, flatness and perfect form grinding are essential. Carbide insert on dies weighing up to 300 pounds have been ground without overloading the machine. Surface finishes of one to three microinch surface finish are readily obtainable without lapping.



Spindles are double taper 2" dia. of high manganese tool steel, hardened, ground and lapped, then fitted to a solid 88-10-2 bronze box. The bearing cones are pulled together in boxes instead of splitting the boxes. The grinder has temperature control on the spindle to predetermine the amount of end play. Wheel guard can be tilted to accommodate the work.

No. 1218 Hydrabrasive surface grinder

Hydraulic drive on this unit assures vibrationless operation because all belts, pulleys and running gear are eliminated. A specially ground steel screw, rotated by hydraulic motor, gives absolute smoothness in finish and accuracy. The use of saddle ball ways allows precise transverse adjustment. The slide moves transversely on thirty $\frac{3}{4}$ " steel balls mounted on hardened steel ways. The motorized spindle is powered by a 3 h.p. totally enclosed, fan-cooled motor which drives the 12" wheel with enough power for all grinding loads. Table overrun beyond the work is



practically eliminated: speeds of 90 ft. per min. are reduced to 0 in only 1" of overrun. Machine is made by Abrasive Machine Tool Co., East Providence 14, R.I.

Boyar-Schultz 6-12 surface grinder

The spindle is designed for very close tolerance, smooth finish grinding and is supported at each end by oversize, pre-loaded, radial thrust, precision ball bearings. Spindle is motivated by a special 1/2 h.p. motor and connected to motor by precision-made pulleys and 6 in. vee belt. Longitudinal table action

is obtained by conventional hand wheel and also by rapid traverse table lever. Either may be disengaged while the other is in use. Table travels on two flat precision and hand scraped ways mounted on main grinder base. Cross feed travel is actuated by lead screw supported by needle bearings and located between table ways. A cross feed binding screw stops transverse motion when desired. Machine is made by Boyar-Schultz Corp., Chicago 12, Ill.

Specifications of American-built surface grinders

Sanford Mfg. Corp.			Union, N.J.	
Type and Model	W=Work Surface of Table M=Magnetic Chuck Surface	LT=Long. Table Travel TT=Trans. Table Travel VT=Vert. Travel	Grinding Wheel	Horsepower and Spindle Speed
Surface Grinder Model SG Bench Type	M=3"x5"	LT=8" TT=4" VT=6"	4"x 3/8"x 1 1/2"	1/6 h.p.; 5500 r.p.m.
Model MG	W=5 5/8"x12 1/2"	LT=13" T=8 3/4" VT=12" under 7" wheel	7"x 1 1/2"x 1 3/4"	3/4 h.p.; 3000 r.p.m.

Take the advise of one who knows!
**When you replace your old Spindle or
when you order a new Surface Grinder**

**specify
WHITNON
SPINDLES**

Heavily spring preloaded to keep spindle radially and axially rigid. — Stock Spindles are one full horse power, 3600 RPM enclosed motor, 220/440 volts, sealed in lubrication.

Sparks out fast leaving an excellent finish. — The only spindle rigid enough for crush dressing and perfect contour grinding.

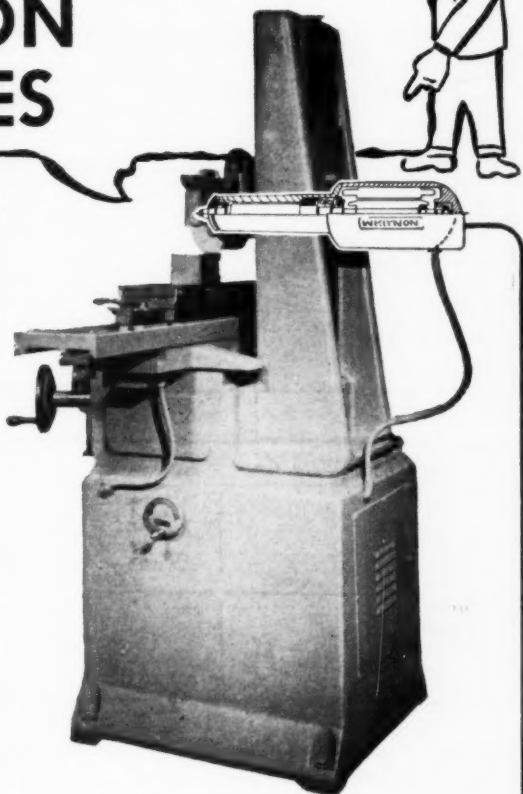
Constant adjustment from spring preload keeps spindle rigid regardless of wear or temperature change.

*for greater efficiency
modernize with Whitnon*

Inquiries regarding standard or special Spindles for grinding, milling, boring and drilling operations receive immediate attention.

*Inquire today, specifying machine,
voltage, frequency and phase.*

THE WHITNON MANUFACTURING COMPANY
217 HIGH STREET NEW BRITAIN, CONN.



The Cleveland Grinding Machine Co.
Cleveland, Ohio

Type and Model	Capacity	Lens Magnification	Work Table	Screen
Contour Grinder	6" x 14" x 8" high	10:1, 20:1, 31.25:1, 50:1, 62.5:1 100:1	6" x 18"	18" x 18"

The Hill Acme Co.
Cleveland, Ohio

Type and Model	Table Work Surface H=Horizontal V=Vertical L=Length	Wheel Size	Clearance Under Wheel	Horsepower
Surface Grinder Vertical and Horizontal Spindle Openside Types	H=18", 24", 30", 36", 48" wide; V=18", 24", 30" wide L=60" to 240"	Horiz. type: 20" x 4" x 10" or 2" or 6" face if desired; Vert. type: 18" and 24" table use 26" dia. The 30" table uses 32" segmental wheel	18" or 24" or 30" for 18" table widths; 24" or 30" for 24", 30" and 36" table widths.	For vertical grinders: 30, 40, 50 h.p.; for horizontal grinders: 15, 25 or 30 h.p.

H. Leach Machinery Co.
Providence 4, R.I.

Type and Model	Capacity	T=Table Work Surface VT=Vert. Travel of Slide TT=Trans. Travel of Slide	Grinding Wheel	Horsepower and Spindle Speed
Surface Grinder 6" x 12"	6" x 12" x 10 1/2" under 7" dia. wheel	T=6" x 12" VT=10 1/2" TT=6"	7" x 1 1/4" x 1 1/4"	3/4 h.p. 2750 and 3500 r.p.m.

The Thompson Grinder Co.
Springfield, Ohio

Type and Model	Work Surface of Table	LT=Long. Table Travel TT=Trans. Table Travel	Grinding Wheel	Horsepower and Wheel Surface Speed
Surface Grinder Type P 6 x 10 x 18 Toolroom	6" x 18" x 10" (Vert. Dist. from Table to Wheel)	LT=20" TT=6"	12" x 3/4" x 3"	1 1/2 h.p.; 5400 s.f.m.
Type 2F 8" x 10" x 24"	8" x 24" x 10" (Vert. Dist. from Table to Wheel)	LT=29" TT=8"	do	do

The Thompson Grinder Co.
Springfield, Ohio

Type and Model	Capacity Width x Height x Length	Grinding Wheel	Horsepower and Wheel s.f.m.
Hydraulic Surface Grinder			
Type B			
1	6" x 12" x 18"	12" x 1" x 5"	3 h.p.; 5400 s.f.m.
2	8" x 12" x 18"	12" x 1" x 5"	3 h.p.; 5400 s.f.m.
3	8" x 12" x 24"	12" x 1 1/2" x 5"	3 h.p.; 5400 s.f.m.
4	10" x 12" x 24"	12" x 1 1/2" x 5"	3 h.p.; 5400 s.f.m.
5	12" x 12" x 24"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
6	9" x 12" x 40"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
7	9" x 12" x 60"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
8	12" x 12" x 40"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
9	12" x 12" x 60"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
10	12" x 12" x 24"	20" x 2" x 8"	7 1/2 h.p.; 6000 s.f.m.
B48	12" x 12" x 72"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
B49	12" x 12" x 84"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
50	12" x 12" x 96"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
B51	12" x 12" x 120"	12" x 2" x 5"	5 h.p.; 5400 s.f.m.
Type C			
Nos. 11 to 14	12" x 16" x (4 lengths: 40, 48, 60, 72)	20" x 3" x 8"	15 h.p.; 6000 s.f.m.
Nos. 15 to 18	14" x 16" x (4 lengths: 40, 48, 60, 72)	do	do
Nos. 19 to 26	16" x 16" x (8 lengths: 40, 48, 60, 72, 96, 120, 144, 168)	20" x 6" x 12"	30 h.p.; 6000 s.f.m.
Nos. 27 to 33	18" x 16" x (7 lengths: 48, 60, 72, 96, 120, 144, 168)	do	do
Nos. 34 to 40	20" x 16" x (7 lengths: 48, 60, 72, 96, 120, 144, 168)	do	do
Nos. 41 to 47	24" x 16" x (7 lengths: 48, 60, 72, 96, 120, 144, 168)	do	do
Surface Grinders			
Heavy Duty Nos. 101 to 107	30" x 36" x (7 lengths: 72, 96, 120, 144, 168, 192, 240)	20" x 6" x 12"	30 h.p.; 6000 s.f.m.
Nos. 108 to 114	36" x 36" x (7 lengths: 72, 96, 120, 144, 168, 192, 240)	do	do

Lempco Products, Inc.**Bedford, Ohio**

Type and Model	Capacity, Round and Square	Work Mounting	Work Spindle Speed	Horsepower and Wheel Speeds
Vertical Turning or Grinder Model V.A.C.	25½" dia. x 8" high; or 18" x 18" x 8" high	3 jaw chuck 18" dia.; 18" dia. face plate or adaptor for magnetic chuck	Inf. variable from 80 to 130 r.p.m.	¾ h.p. for main work, and 1 h.p. for grinder work. 3000 r.p.m. for 8" wheel; 4000 r.p.m. for 6" wheel; 6000 r.p.m. for 4" wheel
Surface Grinder Model DSM Disc Type	Over-all width and length 24"x50" long. Grinding wheel=14" O.D. full 1¼" stone thickness, 4" rim width. Motor is 3 h.p. heavy duty repulsion-induction type.			

Taft-Peirce Mfg. Co.**Woonsocket, R.I.**

Type and Model	Chuck	Travel	Grinding Wheel	Horsepower and Spindle Speed
Rotary Surface Grinder 6"	Work Surface, 6¼" dia.; Magnetic area, 4¼" O.D., and ¾" I.D.	Cross travel, 4" vert. travel, 12"	7" x ½" x 1¼" Work height under wheel is 12"	.4 h.p., 120 r.p.m.

Covel Mfg. Co.**Benton Harbor, Mich.**

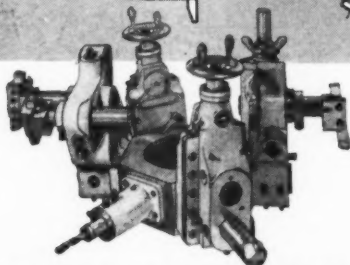
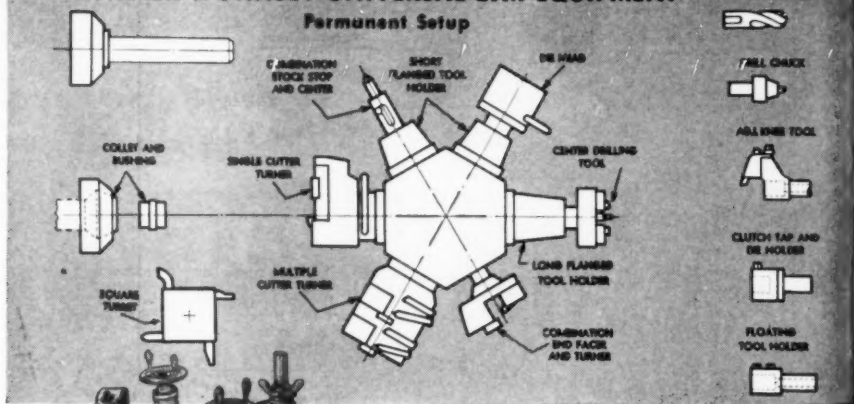
Type and Model	Work Surface of Table	LT=Long. Table Travel TT=Trans. Table Travel VT=Vert. Travel	C=Capacity Under 10" wheel G=Grinding Wheel	Horsepower and Spindle Speeds
Surface Grinder No. 15	6" x 18"	LT=19½" TT=7½" VT=11"	C=10" G=10" x ¾" x 2½"	¾ h.p., 1900, 2350, 2900 r.p.m.
No. 20	do	LT=20" TT=6¾" VT=14"	C=6" x 18" x 12" G=8" or 10" x ¾" x 1¼"	1½ h.p., 2400, 2900, 3400 or 1900, 2400, 2900 r.p.m.
No. 35	8" x 24"	LT=27" TT=9" VT=14"	C=8" x 24" x 11" (under 12" wheel) G=12" x ¾" x 3"	2 h.p., 1750, 2200, 2600 r.p.m.

Delta Power Tool Div., Rockwell Mfg. Co.**Pittsburgh 8, Pa.**

Type and Model	Max. Length and Width to be Ground	Wheel to Table Under 7" Wheel	Grinding Wheel	Horsepower
Surface Grinder Toolmaker Model	13½" x 6"	11½"; Under No. 510 B&S chuck, 8"	7" dia. x 1¼" hole Max. dia. of cup wheel, 3½"	½ h.p.

WARNER & SWASEY UNIVERSAL BAR EQUIPMENT

Permanent Setup

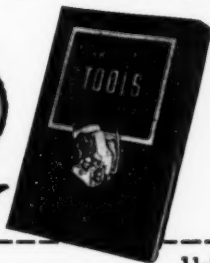


Use Warner & Swasey
Standard Tools to

SPEED UP—SIMPLIFY YOUR PRODUCTION

YES, you can make Warner & Swasey standard turret lathe tools and Universal Tooling Setups *pay off*—with increased production, less setup, handling and cutting time, longer tool life. This free book clearly and simply explains how to select tools and improve setups, combined and multiple cuts, and many other modern tool applications. Fill in and mail the handy coupon for your free copy—today!

THIS
FREE BOOK
TELLS YOU HOW



11-53

WARNER & SWASEY COMPANY
Department 320-MT, Cleveland 3, Ohio

Please send me my free copy of "Turret Lathe Tools" today!

Name
Company
Position
Address
City Zone State

**WARNER
&
SWASEY**
Cleveland
PRECISION
MACHINERY
SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS
WITH WARNER & SWASEY MACHINE TOOLS,
TEXTILE MACHINERY, CONSTRUCTION MACHINERY

Type and Model	L=Long. Table Travel TT=Trans. Table VT=Vert. Travel	Work Surface of Table	G=Grinding Wheel M=Max. Dist. Wheel to Table	Horsepower and Remarks
Surface Grinders No. 15	L=20" TT=7½" VT=12"	6"x18"	G=10"x1"x2" M=11" (10" wheel)	1½ h.p. 1750 r.p.m. Two models with or without Coolant System
Hand Feed Motor Driven No. 0	L=12" TT=5½" VT=6"	5"x12"	G=6"x½"x½" M=6" (Under 6" wheel)	¾ h.p. 3450 r.p.m.
No. 65 and 65A	L=50" TT=13½" VT=18"	12"x48"	G=14"x1"x3" M=17" (Under 14" wheel or 19½" under 9" wheel)	5 h.p. 1800 and 2140 r.p.m. spindle speed No. 65A is similar to No. 65. Table surface is 14"x48" and 15½" trans. travel
Hydraulic Feed No. 55 and 55A, 55B	L=38" TT=13½" VT=18"	12"x36"	do	5 h.p. 1800 and 2140 r.p.m. spindle speed No. 55A table surface, 14"x36"; trans. travel, 15½" No. 55B table surface, 16"x36"; trans. travel, 17½"
No. 45 and 45A, 45B	L=26" TT=13½" VT=18"	12"x24"	do	3 h.p. 1800 and 2140 r.p.m. spindle speed. No. 45A table surface, 14"x24"; trans. travel, 15½". No. 45B table surface, 16"x24"; trans. travel, 17½"
No. 35 and 36	L=26" TT=9½" VT=14"	8"x24"	G=10"x1"x2" M=12" (Under 10" wheel 14" under 6" wheel)	3 h.p. 2300 and 3000 r.p.m. spindle speed. No. 36 table surface, 10"x24" trans. travel, 11½"
No. 25	L=20" TT=6½" VT=11"	6"x18"	G=8"x½"x1½" M=10" under 8" wheel	1 h.p. 2900 and 3400 r.p.m. spindle speed
Production Type Model F	L=4" more than length of table; TT=16", 18" 20", 24"; VT=27"	16", 18", 20", or 24" wide by 48", 60", 72" or 96" long	G=20"x4"x12" C/B 2 sides 14"x¾" M=25" under 20" wheel	25 h.p. 1160 r.p.m.
Production Type Model A	L=4" more than length of table; TT=14" VT=20"	14" wide by 36", 48", 60", 72" or 96" long	G=14"x3"x5" C/B 2 sides 8"x¾" M=18" under 14" wheel	10 h.p. 1725 r.p.m.
Production Type Model A	L=4" more than length of table; TT=12" VT=20"	12" wide x 36", 48", 60", 72", 96" long	do	do

**For Precision
Between Centers**

EX-CELL-O

CENTER LAPPING MACHINES

Meeting today's precision standards requires careful checking of every phase of the job, including the center holes in the work. Ex-Cell-O Center Lapping Machines correct inaccuracies of center holes that affect the quality of all subsequent operations performed between centers. These machines are precision built and are easy to operate. They are fully described in Bulletin 40271—a copy is yours for the asking.

**EX-CELL-O
CORPORATION**

DETROIT 32, MICHIGAN



The Sheffield Corp.
Dayton 1, Ohio

Type and Model	Max. Work Range	L=Length Ground One Setting W=Width T=Thickness	S=Std. Grinding Wheel M=Max. Grinding Wheel	Magnification
Micro-Form Grinder No. 121 No. 122	Direct= .400" x .400" x 2" thick Indirect=6" long x 2" thick x 2 1/2" deep	L=6" W=10" T=4"	S=6"; M=6" WL=5 1/8"	30 power, No. 121 with scope only; No. 122 with viewing screen and scope.

Crystal Lake Grinders
Crystal Lake, Ill.

Type and Model	C=Chuck GC=Grinds Over Chuck	TL=Table Travel, Long. TT=Trans. Travel	Grinding Wheel	Horsepower and Wheel Speed
Surface Grinder	C=6x12 permo-magnetic GC=15" with 8" wheel	TL=20" TT=9"	8" x 1 1/2", 3/4", 1" x 1 3/4" or 9" x 1 1/2" x 1 3/4"	1 1/2 h.p. 5,000 and 5,600 s.p.m.

Abrasive Machine Tool Co.
East Providence 14, R.I.

Type and Model	Capacity L=Longitudinal T=Transverse V=Vertical	Work Surface of Table	Grinding Wheel	Horsepower
Surface Grinder No. 1 1/2"	L=15" T=10" V=12"	10" x 15"	12" x 1 1/2" x 3"	1 h.p. 1750 r.p.m.
No. 3B	L=24" T=8" V=12"	8" x 24"	10" x 3/4" x 3"	3 h.p. 1750 r.p.m.
No. 3M	Similar to 3B with a motorized spindle which eliminates spindle driving belt. Table feed provided by V-belt drive from individual 1/2 h.p. motor.			
1218	L=18" T=12" V=12"	12" x 18"	12" x 1" x 3"	3 h.p. 1750 r.p.m.
Hydro-brasive Face Grinder 18"	Length to be ground: from 1" to 8 3/4" high and 1" to 20" long	13" x 36"	18" O.D. Feeds: Trans. 3 1/2" Vert. 7 1/4" Long. 24"	15 h.p. 900 r.p.m.
Vertical Spindle No. M34	L=24" T=8" V=12"	8" x 24"	6" dia.	5 h.p. 3450 r.p.m.
Internal Finisher No. 5 AWF	Swing with guard=6" without guard=15" Max. hole dia.=5"	Travel of two work slides, 4"; Work head swivels 110°	Grinding heads two types: No. 5 has capacity 1/8" to 1 1/2" dia. spindle speeds 4,600 to 42,500 r.p.m. H=77 capacity over 1"; spindle speeds, 3,400 to 13,800 r.p.m.	

here it is!



HYDRAULIC THREAD MILLING MACHINE

... a new Hanson process that permits maximum operation efficiency under the widest possible range of conditions.

Simply by turning a dial, even during operation, operator can adjust machine to coordinate all machining elements.

As a result, production rates can be increased and maintained, and cutter life can be considerably increased.

Manufactured in the following capacities: 4"x 9", 8"x 16", 10"x 24", 15"x 30". Longer beds and larger swings to suit customers' requirements.

If you have a threading problem, the "Hanson Processes" will offer you the most economical solution. Investigate today!



Engineered, Produced and Sold by the
HANSON-WHITNEY DIVISION OF THE WHITNEY CHAIN CO.
160 Bartholomew Avenue Hartford 2, Conn., U. S. A.

10HW535

THREAD MILLING MACHINES • SMALL TOOLS • GAGES

The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio

Type and Model	M=Magnification A=Area Covered by lens	Range, Work Platen L=Longitudinal T=Transverse V=Vertical	TS=Travel of Slide TA=Trans. Adj. of Saddle VA=Vert. Adj. of Vert. Slide	Horsepower
Projecto-Form Grinder	M=20 to 1 std. or 40 to 1 A=.9" x .837" std., to .45" x .418"	L=4 1/4" T=4" V=1 1/2"	TS=7 1/4" TA=5" VA=4"	Motor hydraulic, 3/4 h.p.; Spindle 1 h.p.

Boyar-Schultz Corp.
Chicago 12, Ill.

Type and Model	Work Surface of Table	LT=Long. Table Travel TT=Trans. Travel VT=Vertical Travel	Grinding Wheel	Horsepower and Spindle Speed
Surface Grinder Model 6-12	5 1/2" x 12"	LT=13" TT=7" VT=11 1/2"	7" x 3 1/2" x 1 1/4"	1/2 h.p. 3200 r.p.m.
Floor or Bench Models Model 6-18	6" x 18"	LT=19 1/2" TT=6 1/2" VT=10"	8" x 1 1/2" and 3/4" x 1 1/4"	1 1/2 h.p. 3000 r.p.m.
Profile Grinders No. 1	Table is 10" x 10"; setting angle 5° max.; height adjustment is 1 1/4", 1/2" to 3/4" wheels are used; Motor is 1/2 h.p.			
Bench Type No. 2	Table is 20" x 18"; tilts 10°; height adjustment is 4", 3/4" to 3" wheels are used; motor is 1 h.p. upper spindle, 2 h.p. lower spindle. Speed is 10,00 r.p.m.			
Dual Spindle Floor Type No. 2	Same specifications as No. 1			
Single Spindle Floor Type				

Austenitic alternate for 18-8 stainless

An austenitic alternate for 18-8 stainless has been developed by Allegheny Ludlum Steel Corp., Dept. BB, Pittsburgh 22, Pa., which is said to offer good cold working properties, good weldability, and good ductility. Produced with manganese, chromium, and less than one per cent nickel as principal alloying elements, this steel offers promise of widespread usefulness. Af-

ter being under development for many months chromium-manganese stainless strip is now being produced in substantial quantities, and is available in most other forms.

The development work was undertaken because of the restricted usage of nickel, in an effort to obtain an austenitic stainless steel with less than one per cent nickel. This steel is needed where straight chromium steels are unsatisfactory as substitutes for 18-8.

NOW...a Blue Chip Investment...



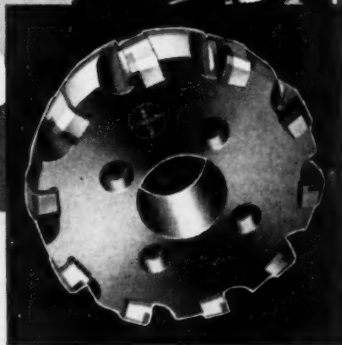
**THE MATCH & MERRYWEATHER
FACE MILLING CUTTER
AND SHELL END MILL**



Only 3 PARTS

**RUGGED
RIGID**

Match & Merryweather now offers to Industry a new, proven aid to profitable production — KROSLOK. . . rugged and rigid in an unprecedented degree. . . reaching new highs in continuous, trouble-free operation. KROSLOK combines the most effective devices for positive blade holding: wedge, cross serration in body and blade, and "beefiness". You get faster feeds and speeds. General purpose and heavy duty bodies, each for ferrous and non-ferrous applications; 3" through 24" diameter; specials to your order.



**THE
MATCH & MERRYWEATHER
MACHINERY CO.**

Cutting Tool Manufacturing Division
Cleveland 13, Ohio

MODERN TOOLS

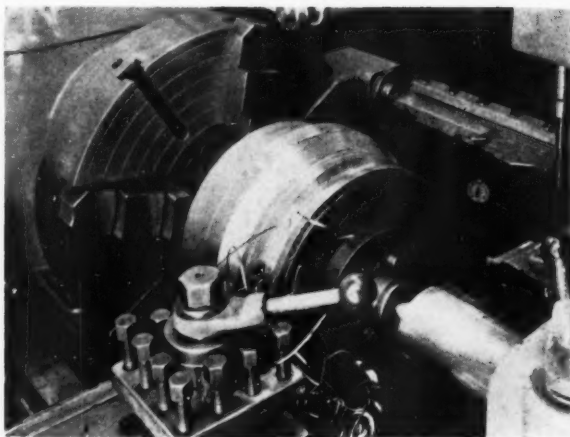
in
ACTION

50% Time Saved With Copymatic

NORRIS STAMPING & Mfg. Co., Los Angeles, Calif., claims 50% time saved refinishing auto rim roll dies for Ford and Chevrolet, by using the Copymatic lathe 20" x 72" h.d., manufactured by The Lodge & Shipley Co., Cincinnati 25, Ohio.

This material is high chrome, high carbon steel 65 Rockwell C scale. Tooling is carbide tipped and feed is .010" per revolution.

The Copymatic offers the convenience and speed of hydraulic duplication with the versatility of the L & S Model X engine lathe, taking it out of the special purpose machine class. Features include: 24 spindle speeds; 3 roller bearing spindle mounting; ball stop; hardened cross feed screw threads; compensating cross feed nuts; apron feed

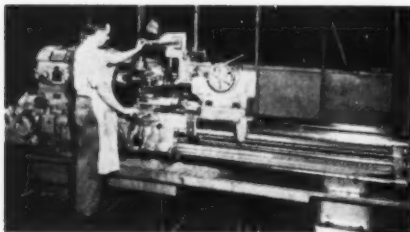


and thread interlock; automatic lubrication; hardened steel bedways; totally enclosed quick change gear box; heavy, rugged design.

Boost magnet manufacture

A 200% boost in production of small "U" type Alnico magnets has been made possible at the Indiana Steel Products Co., Valparaiso, Ind., by the replacement of "hand fixturing" type grinders with Besly vertical spindle wet type grinders.

Production of small "U" type magnets on the Besly grinders is about 500 pieces per hour with fast operators turning out as many as 800 per hour. Magnet castings are loaded on a 48" dia. rotary feed wheel, automatically clamped in place and re-





volved beneath a 36" dia. Besley-Titan resinoid bonded grinding wheel. After one side of the magnets is ground, they are turned over manually and the second face ground. Squareness and height are brought to close limits in this operation.

Seven Model 953-36" grinders are now in operation in this plant.

A new Besley grinder similar to the others but with additional automatic operating features has just been installed and is being set up to grind ring type magnets. Ends must be parallel within .003 full indicator reading and the ground surfaces must be squared with the sides within $\frac{1}{2}$ of one degree.

Tungsten carbide ratchets help reduce saw production costs

Substantial savings in equipment costs in addition to elimination of much down time for changing machine components were recently secured at Henry G. Thompson & Son's New England plant by switching from an oil-hardened tool steel feed ratchet to one made of solid tungsten carbide.

Operators of the plant, manufacturers of profile, band and hack saw blades, reported that their 1-inch diameter, 10-pitch Kennametal carbide ratchet is outlasting more than 60 of its tool steel contemporaries.

Briefly, Thompson's operation is as follows: Band-saw stock is fed at a pre-set rate by means of a ratchet through Kennametal carbide setting dies which

MARSHALLTOWN

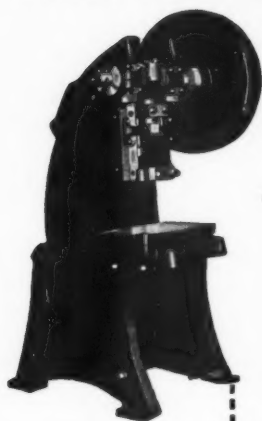
OPEN BACK INCLINABLE PUNCH PRESSES

Soundly Engineered — Ruggedly Built for

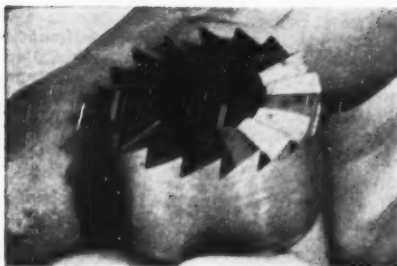
---- PRECISION & ECONOMY ----

- All bearings honed to exact sizes, guaranteeing perfect fit and alignment.
- Matched unit slide and gibs pre-finished by precision lapping with newly developed process.
- Chrome molybdenum cranks, wrist pin connections.
- Easy to maintain — economical to operate.
- 5 to 70 tons capacity.
- 9 models.

MARSHALLTOWN MFG. CO.
MARSHALLTOWN, IOWA



Write today
for
literature



produce the desired set in the saw teeth. Steel stock comes off one reel in a vertical position with teeth up, through the setting dies, and onto a take-up reel. The feed ratchet, driven through a gear train, is synchronized with the setting die to assure the proper feed cycle for a correct saw tooth set.

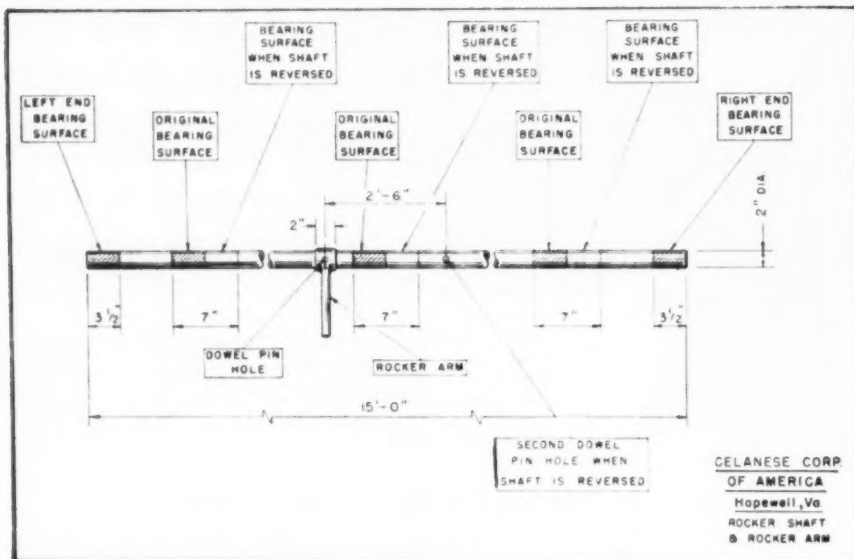
Since the ratchet maintains continuous contact with the steel saw stock, any excessive wear on its teeth results in improper feed and scrapped saw stock.

Metallizing replaces brazing in repair of knitting machine shafts

"Haven't had to buy a new rocker shaft since we purchased our metallizing installation in 1944," says the plant manager of a large Virginia textile plant. The shaft is 2" in diameter and 15 feet long and is used to control the up-and-down motion of the "heddle" in a knitting machine. The rocker shaft, which is made of cold-rolled steel, moves back and forth in 5 cast-iron bearings, each approximately 3" long, and is controlled by a rocker arm

held fast to the shaft with a dowel pin. They normally wear on all five bearing areas and can cause inefficient operation unless repaired or replaced. They can be reversed once as indicated by the drawing. The process was discovered by Metallizing Eng. Co., 38-14 30th St., Long Island City 1, N.Y.

Each of the worm areas is turned down $\frac{1}{8}$ " on the diameter, rough threaded with a Rex AAA carbide tool



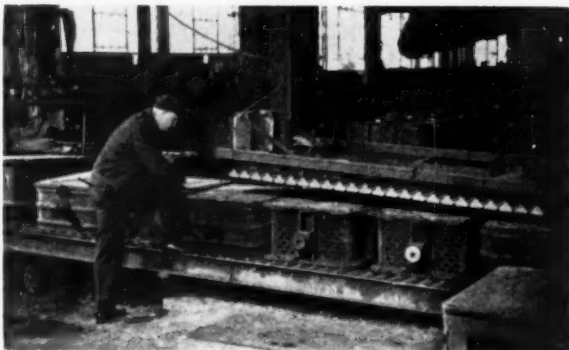
and metallized with a 25 carbon steel, using $\frac{1}{8}$ " wire in a Metco 2E gun. The metallized areas are then turned down to the original 2" diameter.

Before they began using metallizing they would braze the worn areas on

the rocker shafts, but this took twice the time and cost twice as much for materials. This metallizing user stated that a new shaft cost about \$80.00, but that none had been purchased since they began using metallizing in 1944.

Speed drying with infrared

Ohio Steel Foundry, at Springfield, Ohio, has replaced overnight air-drying, and now dries silicone wash on molds for gear castings in $7\frac{1}{2}$ minutes with Chromalox far-infrared electric radiant heaters made by Edwin L. Wiegand Co., 7527 Thomas Blvd., Pittsburgh 8, Pa. A single bank of 24 heaters, rated at 1.8 kilowatts each, is suspended over the conveyor carrying the molds. During drying, the heaters are lowered to within a few inches of the top of the molds, but when not in use they can be raised to the ceiling.



Only the drag half of each mold is sprayed with the silicone wash in this

#2 IMPERIA

universal tool
and cutter grinder

immediate delivery

Swing over table	10"
Distance between centers	20"
Surface of table	5" x 32"
4 spindle speeds, r.p.m.	2900 to 5800

Thousands in use all over the world. Many in this country where they may be seen in operation.



Parker Machine Company, Inc.
158 Pioneer St., Brooklyn 31, N.Y.
Triangle 5-2103 and 2157



write
or phone
for full
details

eliminate the guesswork in selecting tool steels

Thousands of metal working people are using the Crucible Tool Steel Selector to determine exactly which type of steel



HERE'S AN EXAMPLE:

Application — Deep drawing die for steel

Major Class — Metal Forming — Cold

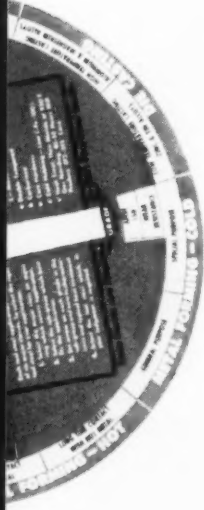
Sub-Group — Special Purpose

98% of all tool steel applications.

The selector is unique because it starts with the ultimate use of the steel. It breaks down all tool steel applications into six major classifications, under which the different grades of steel available for certain specific requirements are indicated in legible cutouts. Heat treatment and machinability data are also included for each grade.

A flip of the dial will give you the answer, and almost just as quickly you can get the steel you select. For each type of steel shown on the selector is in stock in Crucible warehouses, conveniently located throughout the country.

To get your Selector merely fill in the coupon and mail. There is no obligation whatsoever.



Tool Steel — Airdi 150

A turn of the dial does it! And you're sure you're right

1/3 actual size, Selector is in 3 colors

Crucible Steel Company of America
Dept. MB, Oliver Building
Pittsburgh, Pa.

Name _____

Company _____ Title _____

Address _____ City _____ State _____

CRUCIBLE

53 years of *Fine* *steelmaking*

first name in special purpose steels

TOOL STEELS

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

operation. The cope is not sprayed because it contains very little cavity and none of the gear tooth surface. About 25 drag molds are dried per hour. After drying, the molds are cooled by a fan at the end of the heating line. This prevents condensation from forming and permits immediate mounting of the cope and pouring of the mold.

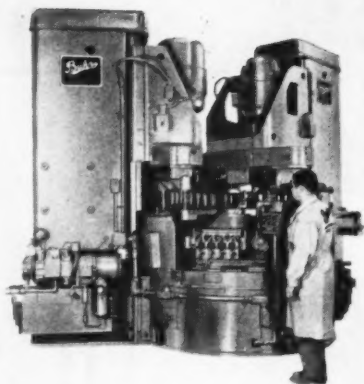
Automatic machine for connecting rods

This two-column automatic machine, for drilling, reaming and chamfering connecting rods, has recently been completed by Buhr Machine Tool Co., Ann Arbor, Mich., and delivered to one of the nation's largest automobile manufacturers.

The machine processes 565 connecting rods an hour and is arranged with tool-steel, laminated, hardened and ground ways.

A single operator loads the parts manually. Parts are hydraulically clamped and automatically ejected.

The eight-station holding fixture is



mounted on a 60"-diameter index table and heavy-duty ball-bearing construction is provided for all spindles.

STOP DUSTS INSTANTLY

with

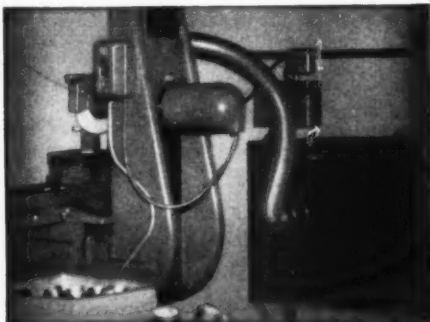
DUSTKOP

Available from stock of 22 standard models

300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problems for recommendation by return mail — no obligation.



AGET-DETROIT CO.

502 Main St.

Ann Arbor, Michigan

Shop HINTS

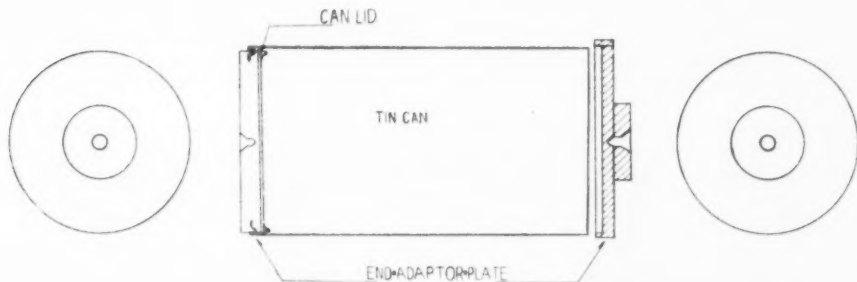


Gadgets Can Save Money

by Harold D. Rhodenbaugh

DEBURRING, or removing burrs from small machined parts, such as washers, nuts, bushings, etc., is an expensive operation. Especially is this true when limited

number of these deburring cans. Adaptors will last indefinitely, and worn-out cans can be replaced through reclamation of tin cans.



quantities are required with no potential, thus making it impractical to invest in adequate deburring equipment.

Pictured is a deburring gadget that can be made to accommodate small job lots at practically no cost.

Simply select size of metal container from your junk pile—a tin can, a quart, two quarts or gallon size—which has a press-fit lid.

Machine two adaptors; place small machine parts plus deburring chips or compound and water into the can. Press lid into place. Locate adaptor to opposite end with emery paper washer between face of adaptor and end of can to create friction drive. Locate between centers in idle horizontal mill, and you are in business.

Any or all departments can afford any

How to turn tubing

by Federico Strasser

There are several emergency methods for turning tubing. Here is one: Wind around the tubing a piece of fine or medium coarse emery cloth, with the working surface against the tubing; now you can exert a much greater effort with your bare hands, due to the greatly increased friction.

Sharpening pliers

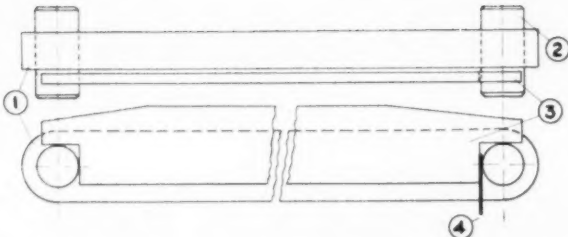
by Federico Strasser

One way to sharpen pliers or nippers is to use a fine-pitch file to reach the indentations or cutting edges, following lightly with an oil stone. Results are excellent.

Gage checks parallelism

by Roger Johnson

To check the parallelism of two $2\frac{3}{4}$ " diameter holes within a long bar (1) at 90" spacing, within .003", we devised this simple and inexpensive gage. The gage proper (3) was made of $5/16$ " thick cold drawn steel. The ends were machined as shown. Two accurately ground pins (2) were made to slip through the machined holes of the work piece. The horizontal machined surfaces of the gage (3) then rest on the top of the pins, while one of the vertical machined surfaces is forced against the side of one pin. The inspector then uses feeler gages (4) to determine the space between the second vertical gage surface and the second pin. To find the amount of out-of-parallel condition, the inspection operation is repeated on the other side of the work piece. The difference between the amount of feelers used on both sides is a direct measure of the out-of-parallel condition. It should be noted here that on this particular ap-



plication the out-of-parallel condition had to be controlled in one direction only.

Grinding tool bits

To grind tool bits (as used in bit holders for lathes, shapings, planers, etc.) freehand, it is necessary to take them from their respective bit holders, for the weight of the holders lessens the sensibility of the hand. Also, reassembly of the ground tool is much easier if only the bit is removed from the tool post, rather than the whole bit holder.



**LARGE MAHR
COMPARATOR**
.00005" graduation
± .002" range



**SMALL SHOCKPROOF
COMPARATOR**
1/1000 or 1/10000"



LEITZ OPTI-COMPARATOR
Reading .00005"
Range ± .0025"

6 SCHERR COMPARETOR GAGES to choose from

Here are the important characteristics which should be carefully considered when making a selection:

ACCURACY AND SCALE DIVISIONS — .001"-.0001"-.00005"-.000005"

PLUS AND MINUS RANGE OF SCALE — The larger the range, the more useful the tool for measuring and assorting.

MEASURING PRESSURE — Slight or heavy; is it adjustable to prevent damage of delicate work and fine finish?

ZERO SETTING — Is it secure and how easy is resetting accomplished?

REPEAT READINGS — Does the instrument repeat its readings in the hands of skilled and unskilled hands alike?

MECHANISM — Is it mechanical or optical and is the action quick and without quiver and vibration?

RELIABILITY — To what extent are backlash, oil films, errors of screws, etc. eliminated?

LEITZ DETHOMETER and ULTRA PROJEKTOMETER
Strictly Optical.
Type A: Scale Read. .00005"
Range ± .005"
Ultra Type: Scale Read. .000005"
Range ± .002"

ELECTRIC INDICATOR
With OK - Go and No Go

Our representatives in all industrial parts of the country are able to give full information and demonstrate any of the tools mentioned in your shop.

GEO. SCHERR CO., INC. COMPLETE LINE OF PRECISION INSTRUMENTS

200 - MT LAFAYETTE STREET • NEW YORK 12, N. Y.

Reduces paint loss

Suggestion of the year by factory employees of The Firestone Tire & Rubber Co., Akron, Ohio, resulted from the teamwork of these two employees of the company's defense products plant in Akron, Ohio. Richard L. Prillaman (left) and Harold Archer show the perforated plate they devised to be used in the ends of five-inch rocket tubes to reduce the amount of paint lost through the open ends of the tubes during the painting operation.



Sack salvages diamonds

An ordinary sack may be the answer to greater diamond salvage in industry.

At the Edmore, Mich., plant of Carboly Department of General Electric

Co., a common cloth sugar bag is the main "component" of a simple method of salvaging diamonds from grinding sludge—recapturing enough diamonds

Doubly Guaranteed

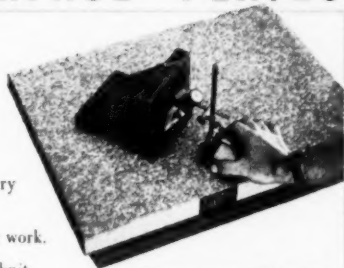
BRYANT GRANITE SURFACE PLATES

NOW, users of granite surface plates can get surface plates that are guaranteed both as to highest quality of stone and utmost precision of surface.

Bryant, maker of precision machine tools and gaging equipment, joins with the world-famous Rock of Ages quarry in producing these new granite surface plates which offer unsurpassed advantages in layout, inspection and assembly work.

Rock of Ages granite is unique in its exceptionally close-knit composition and flawless texture. The stone is finished on the head of the grain, a patented process.

Bryant Granite Surface Plates are economical because of their low initial cost . . . maintenance-free qualities . . . long-lasting accuracy.



Bryant unconditionally guarantees the flatness and accuracy of all Bryant Granite Surface Plates.



Write today for free specification folder

BRYANT CHUCKING GRINDER CO., Springfield, Vermont, U. S. A.



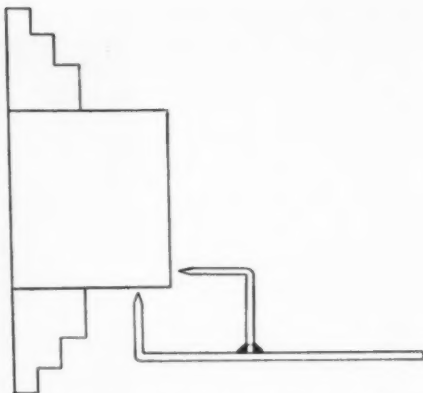
This cloth sack is tied around the pipe which bleeds off both coolant and sludge from a grinder at the Edmore, Mich., plant of the Carboly Dept. of General Electric Co. The cloth bag is used only when diamond wheels are in operation. This process saves thousands of dollars in reclaimed diamonds by concentrating the valuable diamond sludge and making the reclaiming process considerably more economical.

in a month to have them made into four or five additional grinding wheels at a nominal cost.

The bag acts like a coffee strainer. It is tied to the exhaust end of the coolant pipe leading from the machines which grind cemented carbide tools with diamond grinding wheels. When other types of grinding wheels are used on the same machines, the bag is removed to allow the coolant and non-diamond sludge to go into the regular coolant reclamation system. Instead of making it necessary to clean out all of the sludge from the tanks, and processing it for the diamond particles, the bag saves only the sludge coming from the diamond grinding wheels. Salvaging diamonds in a mixed sludge is difficult and costly.

Double-pointed height gage

Height gages are commonly employed for control of correct centering of workpieces in the lathe. It happens quite



often that both the outer cylindrical surface and the anterior face must be centered simultaneously. For these cases a special pointer with two points was built (see attached sketch) which, put into the height gage, in place of the ordinary one-point scribe, permits control of both surfaces at the same time. The tool is essentially a standard scribe with a bent end and a supplementary piece of bent scribe.

Coolant reaches the cutting edge

by Harold D. Rhodenbaugh

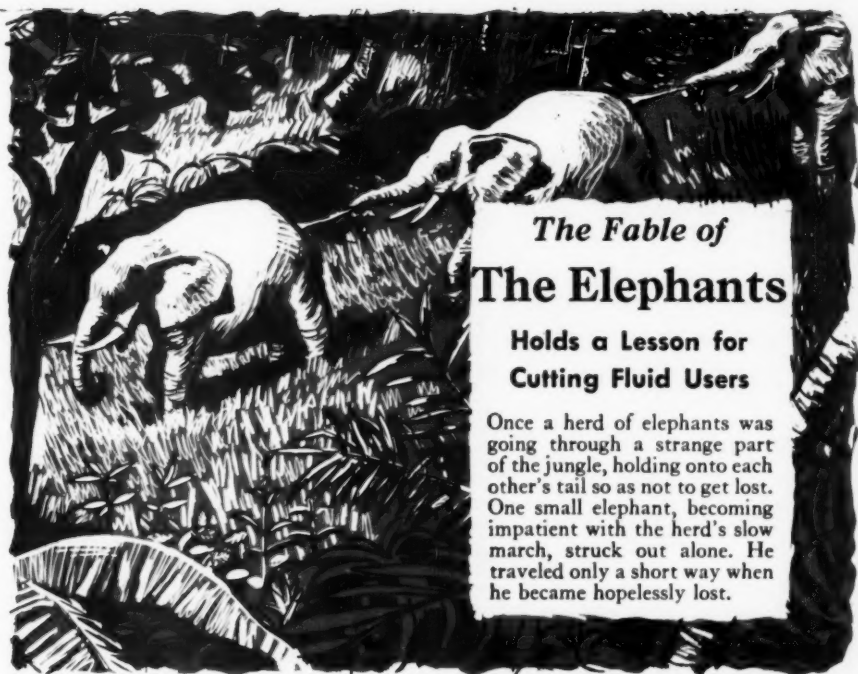
Very often in the average shop job-orders for reaming through long holes are encountered. This type of work is usually routed over turret lathes.

An ample flow of coolant flooding the cutting edges of the reamer is essential not only to tool life, but to maintenance of finish as well.

The greater the depth of the hole, the more difficult it is to get the coolant to the cutting area of the tool since the reamer shank diverts a greater amount of the coolant.

To overcome this difficulty where production does not warrant a more elaborate coolant system, it is well to designate one or more machines for reaming.

Tap into the coolant line at the top, and pipe into the back of the spindle i.d. center-line. The length of pipe used on the i.d. of the spindle should be from one to four inches shorter than the longest tube or shaft to be reamed, and thus it is made adaptable to different length tubes and may be a permanent setup.



The Fable of **The Elephants**

Holds a Lesson for Cutting Fluid Users

Once a herd of elephants was going through a strange part of the jungle, holding onto each other's tail so as not to get lost. One small elephant, becoming impatient with the herd's slow march, struck out alone. He traveled only a short way when he became hopelessly lost.

The Lesson:

Like the little elephant in the fable, it is easy to get lost in the cutting fluid jungle. Realizing this, Stuart Oil has devised a unique Selector to serve as a guidepost to point out the path to the right cutting fluid. The Selector recommends cutting and grinding fluids which field experience has shown to be most suitable under average job conditions.

To make going astray even more difficult, Stuart has developed the Dilut-O-Graph which tells how much cutting oil is required for a certain dilution when blending is done in tanks of different capacities.

Your Stuart Oil Representative will gladly give you a Selector and Dilut-O-Graph. And while he is in your plant, ask him to show you how Stuart cutting and grinding fluids will improve your machining results.

FREE CUTTING FLUID SELECTOR
AND DILUT-O-GRAPH



In this folder is Stuart's Cutting Fluid Selector and Dilut-O-Graph. They are double-barreled protection against mistakes in selecting and preparing cutting fluids. Instructions are included. Send today.

D.A. Stuart Oil co.
EST 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2749 S. Troy St., Chicago 23, Ill.

In Canada: R. W. Horsey Canada, Ltd., Toronto

More Than a
"Coolant"
is Needed

Next, using a piece of cardboard, cut a center hole to fit the diameter of stock to be reamed. Now, cut the outside diameter to press snugly into the collet nose guard. Located thus it will prevent the coolant from spraying out through the master collet slots.

With this coolant line centered to and located from one to four inches from the end of the tube to be reamed, the full force and flow from the coolant pump will insure ample coolant to the right places.

Suggestion for drilling straighter holes

By Federico Strasser

Drilling machines naturally lose much of their original precision and exactness. If one must drill a deep hole, give a little turn (of 60°-80°) to the workpiece at every 1/8" drilling depth. The hole will be square to the workpiece base, even if the drill press table is not exactly at 90° to the machine axis.

INSTANT ACTION RAPIDSET

by HARTMANN

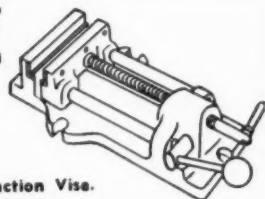
All Purpose Tool Room and Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin



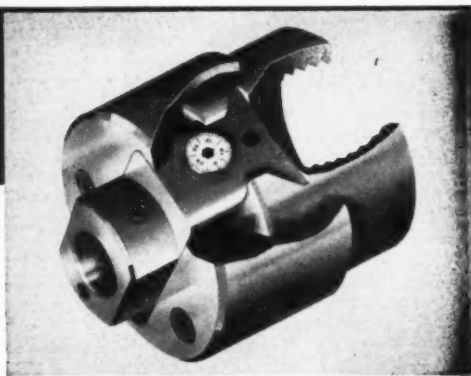
SAMSON Offset BORING CHUCKS

THESE JOB-PROVEN FEATURES WILL
SAVE YOU TIME AND MONEY

- Quick tool change
- Positive dead-centering
- Precision offset adjustment
- Rugged tool support
- Safety round contour

Complete Boring Chuck
Accessories Available

WRITE FOR COMPLETE DETAILS



FAMOUS
LAST WORD
WHEEL
DRESSER



LAST WORD SALES CO. • 18500 Mt. Elliott • Detroit 34, Mich.

This magnifier is a favorite in toolrooms



Write today
for tell-all
handbook and
catalog,
"INDUSTRIAL
MAGNIFIERS,
HOW TO
CHOOSE AND
USE THEM"

Combines extremely wide field ($2\frac{3}{4}$ "') with moderately high magnification (3.5X). Double lenses for reducing aberration. Easy to hold, tough plastic mount. Only \$3.60 at leading industrial suppliers. See complete line \$1 to \$25. Bausch & Lomb Optical Co., 51223 Bausch St., Rochester 2, N. Y.



BAUSCH & LOMB— *Industrial Magnifiers*



MILLING
CUTTERS

BORING BARS
AND HEADS

ARBORS

COUNTERBORES

FLYWHEELS

SPECIAL
CUTTERS

END
MILLS
AND HOLDERS

BLADES

The **Complete** **LOVEJOY LINE** **of Modern Metal** **Cutting Tools**

The Lovejoy line of inserted-tooth type cutting tools has never been more complete — or offered so many features. Every tool has been designed to give maximum production with a minimum of down time for sharpening. Lovejoy tools feature the exclusive "Positive-Locking" device that assures rigidity even during heavy intermittent cuts — making them rugged as solid tools. Their housings — of husky forged steel — are designed for longest life.

Lovejoy H. S. S., Carbide and Cast Alloy Blades are interchangeable in the same housing and are stocked for immediate shipment.

For standard or special cutters, call on Lovejoy — suppliers to the world's leading manufacturers for over 35 years. Write today for Catalog No. 28 which describes the full line of Lovejoy tools.

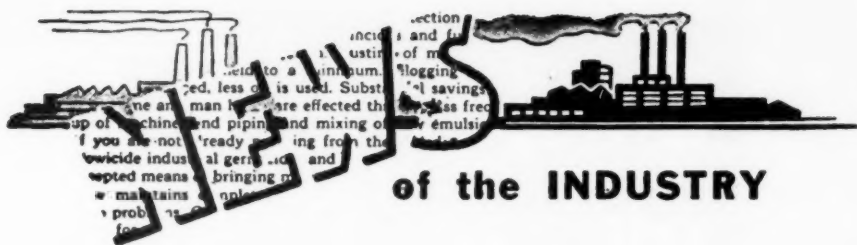
"Speed & Feed Calculator"
free on request



136 MAIN ST., SPRINGFIELD, VERMONT

LOVEJOY

TOOL COMPANY, INC.

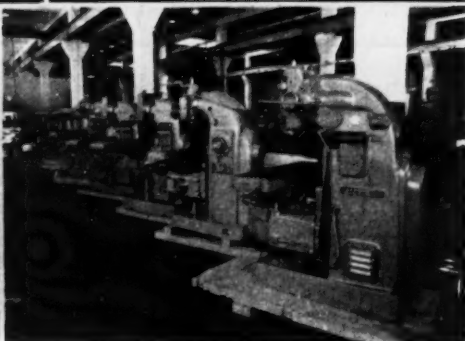
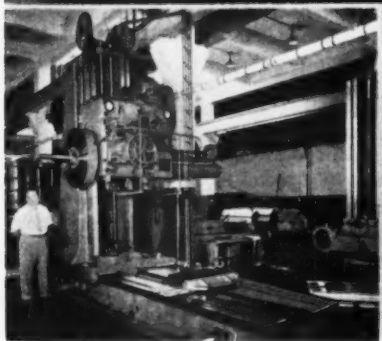
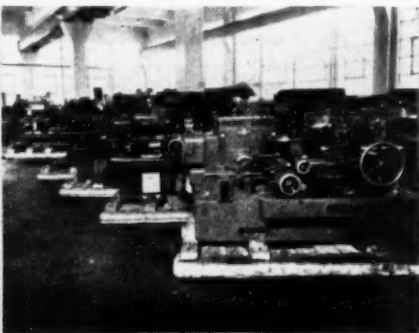
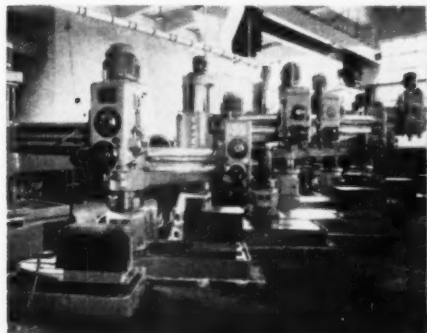


of the INDUSTRY

Machine Tools on Permanent Exhibition

AN UNPRECEDENTED display of hundreds of machine tools under power and available for actual demonstration highlighted the First International Ma-

Rows of elephant-size machine tools from seven countries extend in all directions at the First International Machine Tool Exposition at 132 54th Street, Brooklyn, New York, where 150,000 square feet are available for the tool products of all domestic or foreign manufacturers interested in exhibiting at this first permanent machine tool show in history.



Chicago MOUNTED Wheels

... NOW
even better with
79E BOND

Buy Chicago Mounted
Wheels—bonded with
79E Bond—and you'll
never use any other!

79E—a tough new bond exclusive with Chicago Wheel—is the sensation of the industry... it does a BETTER grinding, burring, and finishing job FASTER. A size and shape for every use. Deliveries are excellent—Order today.



CHICAGO WHEEL & Mfg. Co.

Dept. MT • 1101 West Monroe Street, Chicago 7

chine Tool Exposition which opened in Brooklyn, New York, during October.

This permanent "machine tool city," stretching an entire block through the teeming industrial center of Brooklyn, exhibited an impressive array of the latest tools from the United States as well as France, Italy, Germany, Switzerland, Japan and Great Britain. It is the largest assemblage of machine tools ever brought together under one roof on a permanent basis.

Featured were approximately 200 newly-designed machines never exhibited before. Samples included: the latest in dinosaur-size Italian boring mills, a new American low-cost contour grinder, a new Swiss automatic screw machine, a modern punch press from Chicago, a unique automatic electro-cycle turret lathe from Bologna, a newly-designed openside hydraulic grinder from Germany, milling machines from Italy, a new line of rotary

Fiske

DIE CASTING • FORGING UPSETTING

Compounds

FISKE'S 231 DIE CASTING COMPOUND excellent for die casting zinc and aluminum alloys. Results in cleaner, smoother pieces, free from surface imperfections and discolorations. Stronger and more accurate castings due to minimum gas formations. Does not flash, fume or solder.

FISKE'S GRAPHITE HOT DIE COMPOUNDS for best results in forging and upsetting operations. They eliminate carbon formation on dies, increase die life, with more pieces between changes. Application by brush, swab or spray.

There is a Fiske Lubricant for every metal working operation. Each is an outstanding product and results in more production, better finish and increased tool life. Complete literature available. Write today to Fiske Brothers Refining Co., 121 Lockwood St., Newark 5, N. J., or 1502 Oakdale Avenue, Toledo 5, Ohio.



Established 1870

METAL WORKING LUBRICANTS

gang slitters from England and many other new types and makes of machine tools. The show runs the entire gamut of machine tools including production, fabricating and toolroom equipment.

This permanent exhibit for the first time enables the machine tool buyer to examine and test tools in a variety of brands and styles at one centralized location. Here one finds a wide range of lathes from four different countries, many distinct types and sizes of grinding machines, some twenty-two differ-

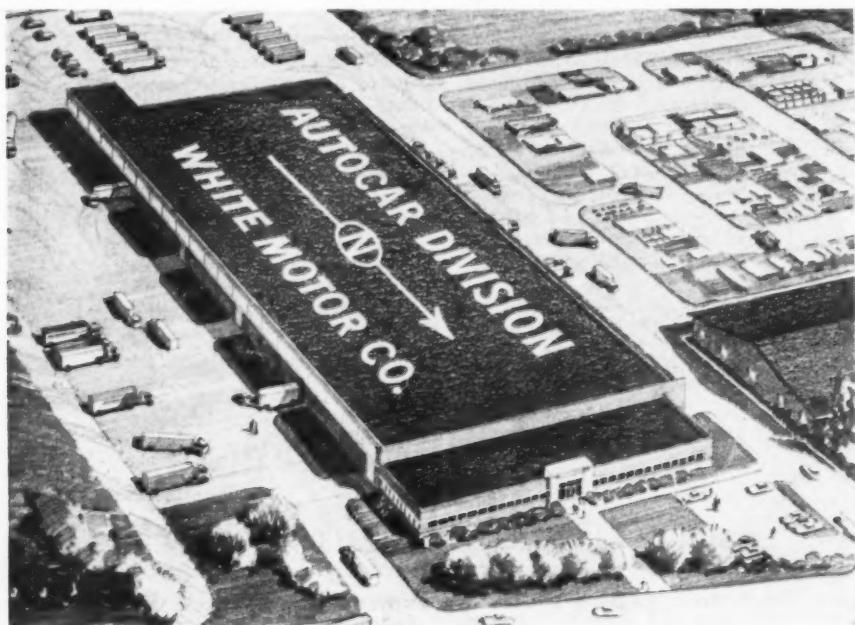
ent drill presses, a wide variety of boring mills and milling machines. By testing and comparing them here under actual working conditions, the machine tool buyer can choose the equipment that best fits his needs.

The exposition was originally conceived and organized by the S & S Machinery Company of Brooklyn. President Simon Srybnik had been nurturing the idea of a permanent machine tool show for a number of years.

White Motor Announces \$2-Million Modernization

CONSTRUCTION WILL start within a few days in suburban Exton, Pa., on new manufacturing facilities for its recently-acquired Autocar division, it was announced today by Robert F. Black, president of The White Motor Co., Cleveland. White's investment program in Exton, planned to replace Autocar's present plant at Ardmore, Pa., will total more than \$2-million. The new construction is expected

to be ready for occupancy early in 1954. The new plant to be erected will provide 130,000 square feet of new manufacturing facilities on one floor, of structural steel and masonry construction, with modern offices having 12,500 additional square feet of floor space, waterworks with a 300,000 gallon reservoir, sewage disposal plant, and covered dock.



Milwaukee Gear building new Plant

In a park-like suburban setting, Milwaukee Gear Company's new plant features a number of new developments in industrial planning. The 15,500 square foot office area will be fully air conditioned, as will be the Gear Testing Laboratory,



ACCURATE AT ANY ANGLE



UNIVERSAL MILLING HEAD

Rugged, compact design and precision manufacturing combine to make the TREE Universal Milling Attachment accurate for milling, drilling or boring . . . **at any angle.** Heavy duty spindle enables $\frac{3}{4}$ " collet capacity. Automatic collet closer. Power feed. Eight spindle speeds. Hardened and ground spindle and quill. Enclosed micrometer depth stop.

Write for free literature describing the MH-4 Milling Head illustrated, the TREE Taper Boring Tool, the 2UV Vertical Mill and other quality TREE Tools. . .



Automatic
**COLLET
CLOSER**

EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address: "STRADESO"

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE

RACINE, WISCONSIN

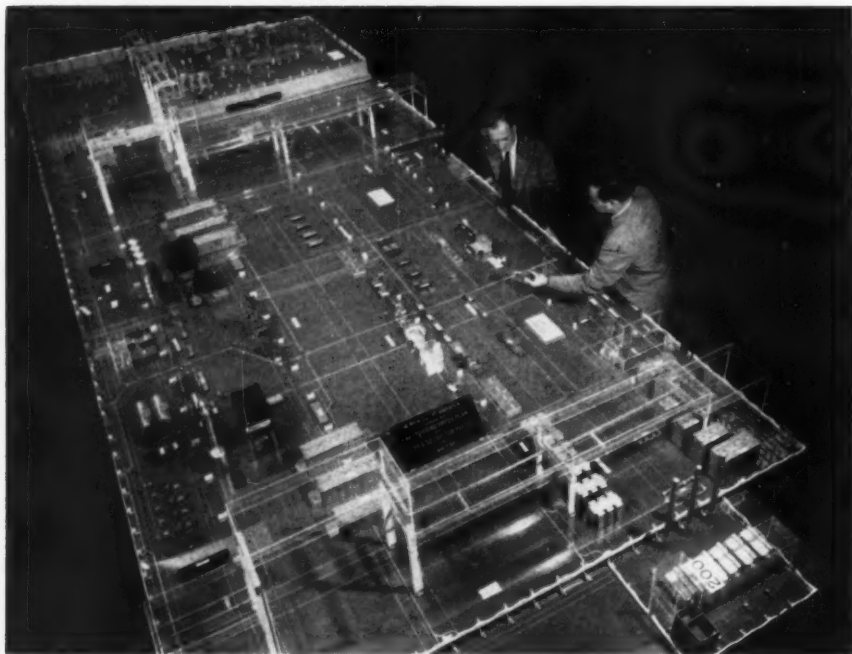
as an example. All windows in these areas will be double-glazed for summer and winter protection.

Time controls will regulate power driven roof ventilators in production areas, providing complete changes of air in the plant at pre-determined intervals. The entire building will be heated with oil, with separate heating plants for the offices and the manufacturing area.

Convenient parking facilities will eliminate employee parking problems, and an out-front parking space is provided for visitors to the plant. A 15½-acre site was chosen with the parking problem in mind.

The new plant contains 110,000 square feet of floor space, to allow for an increase in capacity of approximately 30%. New equipment has been purchased and delivered and more new machines are on order to complete the \$1,500,000 expansion program.

Alcoa builds miniature heavy press plant



The use of a scale model of the new Air Force heavy press plant at Cleveland, O., has allowed Aluminum Company of America to use the knowledge of the men at the shop level in planning the plant layout. The use of a scale model provides a simple method for checking clearances

and space required in three dimensions. The model offers a further great advantage by enabling shop supervisors, foremen, and workmen to make constructive suggestions for improvement of the layout. The model cost \$6500.

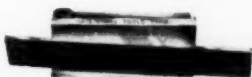
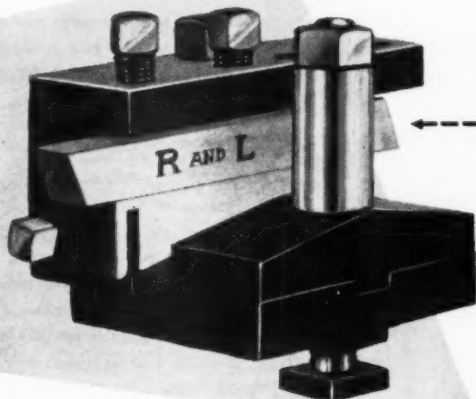
Morse Chain Company announces the appointment of Abrasive and Supply Co., 15443 Woodrow Wilson Ave., Detroit 3, as an additional distributor for the Detroit industrial area.

Kennametal Inc., has established a southern sales district with E. J. Conlan as district manager. Headquarters office of the newly formed district is at 70 Fourth Street, N. W., Atlanta, Ga.

R and L

**UNIVERSAL
TOOL POST**

DOUBLE Duty



specially designed

The R and L Cut Off Blade Holders are precision made to flawlessly fit in the Universal Tool Post.



More than just a tool post! The R and L Universal Tool Post is made by men who completely understand your shop problems. Precision manufactured to hold square or flat tools, providing the means for adjusting the tool in all directions. Can be used close to the chuck, on front or back cross-slide with spindle running forward or backward.

*Write today for
the new
R and L Catalog*

RIGHT R and L LEFT TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

TURNING TOOL • TAP AND DIE HOLDER • UNIVERSAL TOOL POST • TURRET BACKREST HOLDER • CUT-OFF BLADE HOLDER • RECESSING TOOL
KNURLING TOOL • CARBIDE AND ROLLER BACKRESTS • RELEASING ACORN DIE HOLDER • REVOLVING STOCK STOP • FLOATING DRILL HOLDER

DURANT

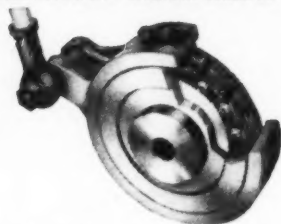
INVESTIGATE THE DURANT LINE OF PRESS ROOM EQUIPMENT

INCREASE PRODUCTION! REDUCE COSTS!

THE SELECT-O-MATIC ROLL FEED INDEXER

Replace your present roll feed clutch with this DURANT SELECT-O-MATIC multi pawl indexer that accurately controls close feeding due to its 6720 possible stations.

Write for complete information on our line of economically priced press room equipment



ROLL FEEDS

Choose from seven different models that take stock from 2" to 5" wide — Insures accurate feeding — Reversible — Simple to install.



SCRAP CHOPPERS

Fits all power presses and has simple electrical plug in installation. Low first cost pays for itself — Pennies per day to operate.



DURANT

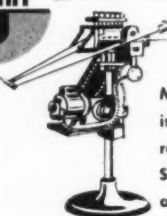
STOCK OILERS

Prolong die life as they clean and lubricate stock in one operation. Variety of models are available. Eliminates hand oiling yet inexpensive.



STOCK STRAIGHTENERS

Motor driven equipment (shown) is perfect for thin materials. Top rolls are adjustable for thickness. Standard straighteners also available.



Inquire about our STOCK REELS, FOOT PRESSES, COIL CRADLES, WIRE STRAIGHTENERS, and PRESS FEEDS. Complete free catalog ready now. Write today.

DURANT TOOL SUPPLY CO. 155 ORANGE STREET, PROVIDENCE 3, R. I.

New York Belting and Packing Co. has announced **William I. Butler**, manager for the southeastern district, with offices in Memphis, has been named district manager for the east central states with offices in Cleveland; **William W. Conard**, with headquarters in Atlanta, takes Butler's place; **Malcolm B. Roach**, sales engineer, has been appointed assistant manager for the southwestern district with headquarters in Dallas.

The Westinghouse Electric Corporation's 57-acre plant at Sunnyvale, Calif., the largest electrical manufacturing facility in the West, will operate in the future

as a single unit under the managership of **George F. Gayer**.

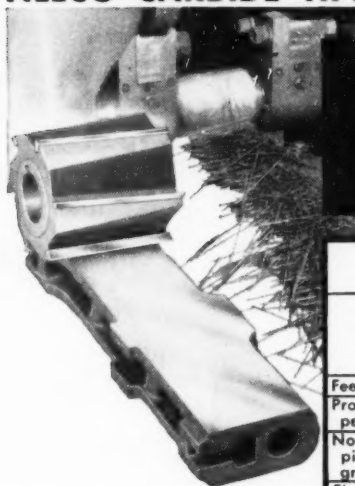
60th anniversary for Marshall & Huschart

The 60th anniversary for Marshall & Huschart Machinery Co., 571 Washington Blvd., Chicago, is being observed this year. Twenty machine tool manufacturers are represented by this firm.

Trade association conference

Armour Research Foundation of Illinois Institute of Technology and the Trade Association Executives Forum of Chicago will co-sponsor a conference on trade association technical problems at the Technological Center, Tuesday, Nov. 17. The

NELCO CARBIDE TIPPED SLAB MILLS



**SET NEW
PRODUCTION
*Records!***

HERE ARE ACTUAL PRODUCTION FACTS

	High Speed Steel slab mill 80 RPM	Nelco carbide tipped slab mill 410 RPM
Feed (in/min)	1 3/4	11 1/2
Production per machine	6 pcs. per hour	29 pcs. per hour
No. of pieces per grind	8	250 (Average)
Finish	Wavy— needed extensive polishing	Superior machine finish

Machine Army Automatic Rifle Receivers in 1/5th the time . . . to better finishes . . . with 30 times more pieces per grind than conventional cutters!

An amazing story, but TRUE! Working on tough, scaly Perlitic Malleable iron castings, Nelco carbide tipped slab mills took a healthy .100-.125 bite—a full 3 1/2 inches wide—on a 3 horsepower machine at the incredible feed of 11 1/2 inches per minute! Not only did the Nelco slab mills surpass conventional cutters in speed, but produced better finishes, 400% more production per machine!

This example is typical of the time-saving, money-saving benefits users report when using Nelco carbide tools. With nearly 800 tools regularly stocked, you can order—and GET—"special" tools at standard prices. For full information on the complete Nelco line, send today for 48 page catalog.

NELCO TOOLS

NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT

For that Extra
EDGE in Production

symposium is designed to show how any association, including limited budget groups, can play a vital technical role for its members in research, gathering and utilizing information, industry-wide testing and standardization, technical and economic predictions through research, and training for industry production men.

200th carload of large machines in 18 months

The 200th carload of elephant size machine tools, totaling 9000 h.p., was re-

cently shipped from the heavy shop addition to The Cincinnati Milling Machine Co.'s Plant No. 2. Starting with a new but empty addition, dedicated February, 1952, all these large machines have been built and shipped within the past 18 months.

To do magnet research

The Indiana Steel Products Co., Valparaiso, Ind., world's largest producer of permanent magnets, has been selected by

CERVINIA ULTRA

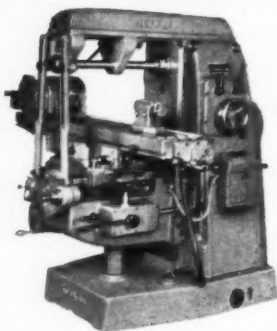
Universal Milling Machine

DELIVERIES

prompt

COST

very low



SPARE PARTS

available

SERVICE

nationwide

SPECIFICATIONS: MORSE TAPER NST No. 50 • WORKING SURFACE: 55" x 12 1/2" • POWER FEED RANGES: Longitudinal 42 1/2", Cross 12 1/2", Vertical 17 3/4" • 18 FEEDS: Range 3 64" to 12" per minute • RAPID TRAVERSE: 80" per minute • 12 SPINDLE SPEEDS: Range 25 to 1000 rpm • MOTOR 7 1/2 HP

For further information, write or call: MISAL MACHINERY, INC.



ENGINE
LATHES



RADIAL
DRILLS



TURRET
LATHES

MISAL



SHAPING
MACHINES



MILLING
MACHINES



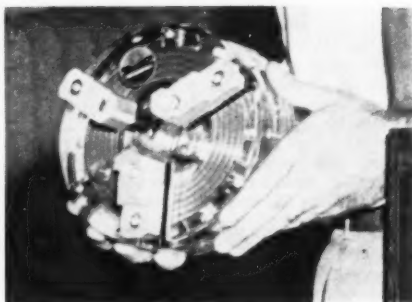
GRINDING
MACHINES

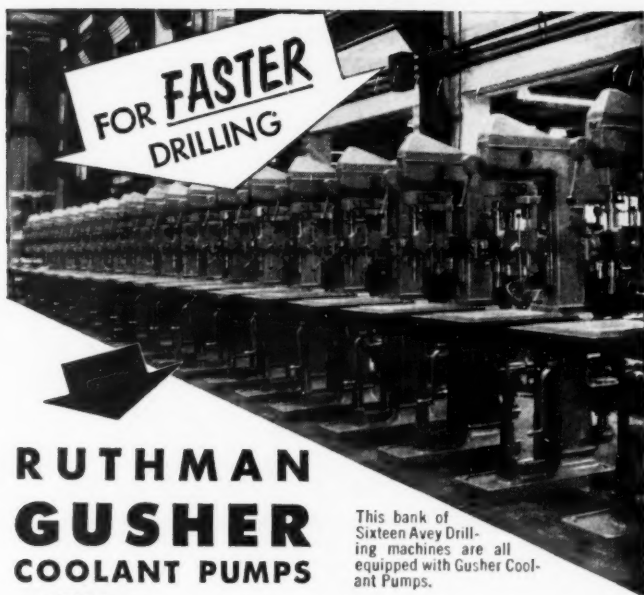
1 EAST 53RD STREET, NEW YORK 22 • ELDORADO 5-7278

the U.S. Air Force for a contract sponsored by the Wright Air Development Center of the Air Research and Development Command to conduct a comprehensive research program on magnetics to improve military air and ground devices utilizing magnets.

Horton Chuck holds 1953 sales conference

The E. Horton & Son Co., of Windsor Locks, Conn., held its first annual sales conference recently. Presented to each of the representatives was a beautifully designed plastic replica of an eight-inch Horton chuck, complete in every working detail with colored parts.





In choosing a coolant pump for your metal cutting machinery it pays to standardize on the best, a Ruthman Gusher Coolant Pump. Leading machine tool manufacturers have learned by experience that Gusher Coolant Pumps are precision built to give better service, and greater production. That's why so many of them use Gusher Pumps exclusively on their machines.

Always specify Gusher Coolant Pumps—You'll eliminate coolant problems.

THE RUTHMAN MACHINERY CO.

1816 READING ROAD

CINCINNATI, OHIO

DeVilbiss awarded government contracts

A government contract totalling nearly a quarter of a million dollars has been awarded to the DeVilbiss Co., Toledo, Ohio, for air compressors which will be used in Air Force motor pools and service centers.

Rapids-Standard to use name Rapistan

The Cleveland, Buffalo and Grand Rapids distributors of The Rapids-Standard Company, Inc., Grand Rapids, Mich., have been incorporated under the trade

name Rapistan. Each of these established sales outlets handles the Rapistan line of gravity and power conveying equipment, industrial casters and hand trucks, and related materials handling equipment.

Flexonics expands

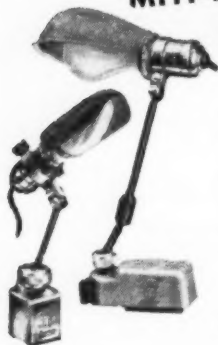
With completion in October of a 30,000 square foot addition to its Memphis, Tenn., plant, Flexonics Corp. will transfer brass bellows production to Memphis from the pilot plant at Elgin, Ill. John F. P. Farrar, president, has announced.

Light where you need it—and in a jiffy



MITI-MITE Magnetic Base

Portable "Handi-Lites"



STANDARD **HEAVY DUTY**
No. 200 **No. 250**
 Up to 40 Watt Up to 100 Watt
 Bulbs Bulbs

Above, below, inside, outside — on tools, machinery, and work—the Handi-Lite has hundreds of uses in every shop. Permanent magnetic base attaches instantly to any ferrous surface, round or flat. Double swivel arms and reflector spot the light exactly where you need it.

Where do you need light? A Handi-Lite will provide it there and in dozens of other spots in a jiffy.

Ask your distributor for a demonstration or write today to Dept. MT for free illustrated booklet.

BUY **LUFKIN**

**TAPES • RULES • PRECISION TOOLS
 FROM YOUR DISTRIBUTOR**

THE LUFKIN RULE CO., SAGINAW, MICHIGAN
 132-138 Lafayette St., New York City • Barrie, Ontario

280

Output of brass bellows, widely used in valve seals and various types of thermostatic and pressure controls, will be stepped up six times.

Chicago Pneumatic acquires assets of Jacobs Mfg. Co. of Connecticut

Chicago Pneumatic Tool Co. announces that it has acquired the assets of The Jacobs Mfg. Co. of West Hartford, Conn., manufacturers of Jacobs chucks. Present personnel and company policies will not be altered.

Special computation services offered by Burroughs research

High-speed computation services, performed automatically on the Burroughs Laboratory Computer, Model I, are now available to business, manufacturing, trade and scientific organizations at the Philadelphia Research Center of Burroughs Corporation (formerly Burroughs Adding Machine Co.).

Developed and improved over the last two years for laboratory study, this electronic digital computer has been

**Any Temperature Between 325° and 1800°
Maintained Accurately**

HUPPERT

Model 2 DeLuxe FURNACE

You couldn't ask for a more dependable furnace for small unit production requiring continuous operation and long hard usage. Accurate control assures you of constant temperatures between 325° and 1800° F . . . always. I.D. 4 1/4" x 3 3/8" x 4 3/4".

110 Volt A.C. Current Consumption.
900 Watts.



OTHER MODELS

	I.D.	Temp. Range	Wattage	PRICE
Model No. 22 DL	4 1/4" x 3 3/8" x 9"	325°-1800°F	1600	All Steel \$110.00
Model No. 4 DL	4 3/8" x 3 3/4" x 6"	250°-1800°F	1600	110.00
Model No. 5 DL	4 3/8" x 3 3/4" x 9"	300°-1800°F	1750	172.00
Model No. 9A DL	6" x 6" x 6"	250°-1900°F	2000	200.00
Model No. 669 DL	8" x 6" x 9"	300°-1900°F	2500	248.00
Model No. 10 DL	8" x 4" x 6"	250°-1900°F	2000	215.00

(Also available in stainless steel at slight additional cost)
Write for catalog, illustrating and describing other models

K. H. HUPPERT CO. 6845 Cottage Grove Ave.
Chicago 37, Illinois
Manufacturers of Electric Furnaces and Ovens

\$80.00

All Steel
Construction

\$95.00

Stainless Steel
Construction

proven on a regular schedule of computations originating primarily within the Burroughs Research organization, located at 511 N. Broad St., Philadelphia 23. Test problems for outside or-

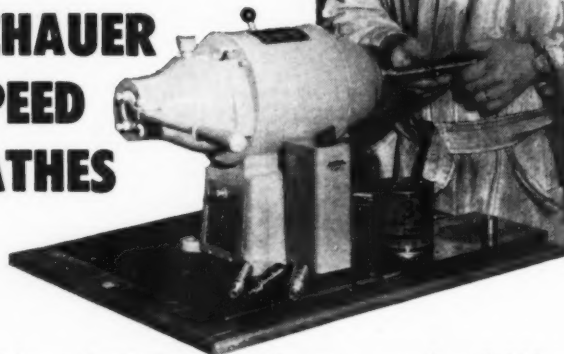
ganizations have included turbo-engine design and performance calculations; pipe stresses for chemical processing plants; optical ray tracing; antenna calculations; and statistical correlations.

Shown are 41 out of over 50 Gisholt No. 12 hydraulic automatic lathes which were damaged in the Detroit transmission fire of August 12th. As rapidly as machines were removed from the plant they were loaded on flat cars and returned to the manufacturer. Detailed inspection showed that better than 1 out of every 3 machines was a total loss.



**DO
LAPPING
AND A ZILLION
OTHER JOBS ON**

**SCHAUER
SPEED
LATHES**



Schauer Speed Lathes handle many secondary finishing operations—lapping, filing, deburring, polishing, etc.—on metal and plastic parts, *faster, at less cost*. Thousands are in use on an almost *unlimited* variety of jobs.

Many sizes and models with holding devices to fit the application. Speed *your* production with Schauer Speed Lathes. Write today for Bulletin 500.

SCHAUER MANUFACTURING CORP.

4502 Alpine Ave., Cincinnati 36, Ohio

Cold roll steel back

Metal product manufacturers in central New England had a local source of cold rolled steel reopened to them recently when the Worcester Pressed Steel Company announced that once more the products of its cold rolled mill were to be placed on the open market.

Clark Equipment Company observes 50th anniversary

Clark Equipment Co., Buchanan, Mich., commemorated a half-century of operation recently with a "50th anniversary

material-handling parade" for directors and employees. Included in the parade were some 40 different models of industrial materials-handling trucks produced by Clark.

Metal Powder Association meets

Approximately 100 members of the Metal Powder Association attended their first fall meeting, devoted exclusively to the members, at The Greenbrier, White Sulphur Springs, Sept. 11-12, with business activities occupying the mornings of both days.

Marking...

**ANY CONTOUR...
ANY MATERIAL...
with
MARKING DIES...**

by Parker

The applications of Parker marking dies are countless — ranging from simple legends . . . trademarks . . . dies with removable inserts . . . to dies that mark and simultaneously perform — crimping, indenting and other press operations. Metal, wood, plastics — all can be permanently marked — regardless of surface contours — with a wide variety of character sizes and styles.

SEND TODAY for "Marking Tools" Parker's new 32 page catalog.



THE
PARKER

STAMP WORKS, INC.

MARKING DIE & MACHINERY DIV.

FRANKLIN AVENUE • HARTFORD, CONNECTICUT

by Parker

Tungsten Institute formed

Formation of The Tungsten Institute with headquarters in Washington is announced by **W. Lunsford Long** of Warrenton, N.C., president of the new organization. The address is 1557 K St., N. W., Washington 6, D.C.

W. H. Brady moves

W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 12, Wis., has recently moved

to that address. They manufacture self-sticking industrial products.

Kurt Orban moves

Kurt Orban Co., Inc., has moved its Detroit offices and service center to larger quarters at 18627 James Couzens Highway. Over \$75,000 of German machine tools—lathes, milling machines, grinders, turret lathes and shapers—have been installed for demonstration and for training.

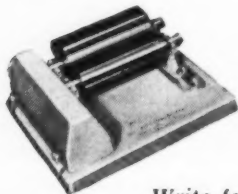
Announcing

the **NEW 24 inch
SPITFIRE
FLAT LAPPING
MACHINE**



**LOW COST
PRECISION LAPPING
AT PRODUCTION SPEED**

A NEW, large size Flat Lapping Machine of improved design for precision lapping of any material where a perfectly flat surface is necessary. Extremely close tolerance finishes are possible. An ideal machine for producing mating surfaces of sliding and rotating parts of air and liquid tight seals, plastic and die casting molds.



**SPITFIRE
ROLLER LAPPING MACHINE**

For lapping cylinders to accurate, mirror-like finishes in less time than any other method. Saves up to $\frac{2}{3}$ time in lapping.

Write for Brochures, Prices and Delivery

SPITFIRE TOOL COMPANY

2933 N. Pulaski Road, Chicago 41, Ill.

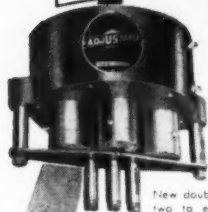


Architect's drawing of the new ultra-modern plant in which the Nox-Rust Chemical Corp. is now installed. Located at 47th Street and Central Avenue on Chicago's outskirts on approximately 15 acres of land, new manufacturing facilities will enable the firm to step up production about 100 per cent.

...to protect your investment...
save time, money and labor!

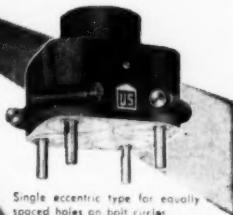


U. S. drill heads are built for continuous use, with full anti-friction bearing construction, for high capacity thrust leads . . . precision-bored, outboard spindle support plate.



New double eccentric AdJUSTive two to eight spindles, for any adjustment. Eliminates the expensive change in set-up from job to job by simply changing the drill pattern plate and relocating spindles. Fully automatic lubrication for either horizontal or vertical operation.

The universal joint adjustable multiple spindle type, an adaptation of a universal joint adjustable spindle, is suitable for any sensitive drilling machine. Joints self-lubricating. Designed for quick change.



Single eccentric type for equally spaced holes on bolt circles.



We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.

UNITED STATES DRILL HEAD CO.,
616-618 Burns St., Cincinnati 4, Ohio

Thor builds new plant in England

Production began recently at a newly constructed plant of Armstrong Whitworth & Co. (Pneumatic Tools) Ltd., a subsidiary of Thor Power Tool Company, Aurora, Ill., at Tynemouth, Eng., following one of the biggest and fastest industrial transfers in Tyneside's history. The entire former factory at Newcastle was transported over a 10-mile route to the new, enlarged plant on the Tyne, in less than two weeks, with 100 men and 20 trucks working on a 'round-the-clock' shuttle operation.

Goodyear's Alabama warehouse measures 1,000 by 400 feet

Completion of the South's largest industrial warehouse was announced by the Goodyear Tire & Rubber Co., Inc., Gadsden, Ala. It measures 1,000 feet by 400 feet.

Norma-Hoffmann Bearings Corp. contemplating further expansion

The Norma-Hoffmann Bearings Corp., having just completed new building and production facility expansion involving approximately \$2,700,000, are now obtaining estimates for construction of still

**Directs
light exactly as
needed as easily
as pointing
your finger**

FOSTORIA LOCALITES

**for Machine Tools,
Assembly and Inspection
Benches**

**NEARLY A
MILLION
NOW IN
USE**

MODEL 3470-P-172

Overall length 48 1/4". Three
instantly adjustable joints.
Circular base for machine
or wood screw mounting.

\$716

EACH

in package of 6
Single Units **\$8.95 Each**



- **Rugged Construction** withstands vibration and rough handling
- **Instantly Adjustable** with flexible ball and socket joints
- **Reflector** accommodates 100 watt or any A-19 or A-21 medium screw base lamp
- **Baked Enamel Finish**— Exterior, smooth Gray— Reflector Interior, high temperature White
- **Wired Complete** with switch socket and 8-ft. oil-resistant cord and moulded plug



Reg. U. S. Pat. Off.

Write for complete catalog
of Localite models with various
type reflectors, arms and bases
for every industrial use.

**THE FOSTORIA PRESSED
STEEL CORPORATION
FOSTORIA, OHIO**

*Localites available through
wholesalers everywhere*

another building in furtherance of plant expansion program. The corporation has its main offices and plant in Stamford, Conn., with warehouses and offices throughout the United States.

Arcair opens Ohio plant

The Arcair Company has announced the opening of an eastern sales and distribution office at 423 South Mt. Pleasant Avenue, Lancaster, Ohio. The company manufactures a new metal cutting and gouging torch introduced only two years ago.

Latrobe Steel moves branch

Latrobe Steel Company, Latrobe, Pa., has announced that its new branch office and warehouse located at 741 Ramsey Ave., Hillside, N.J., began operations on August 28, 1953.

Lehmann Boring Tool moves

Lehmann Boring Tool of St. Louis has moved to a larger plant.

The new location for the entire division—manufacturing shop, engineering department and the general offices—is 4389 Duncan Avenue, St. Louis 10, Mo.

POWERED-AIR JIG-VISE

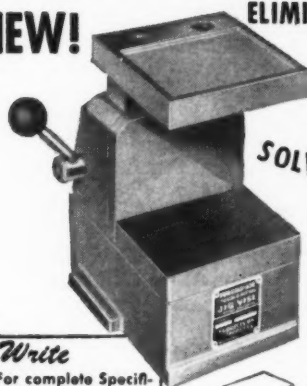
DOUBLE
ACTING

NEW!

ELIMINATE FATIGUE AND INCREASE PRODUCTION
in drilling, reaming, tapping, light forming and assembly jobs.

★ **POSITIVE HOLDING PRESSURE** adjustable from 0 to 10 times line pressure.

SOLVES THE PROBLEM OF "HARD TO HOLD" JOBS!



TWO SIZES INTERCHANGEABLE TOP PLATES AND NEST PLATES!



Working Surface
4" x 2 3/4" or 5" x 3 1/4"



TOP PLATE

NEST PLATE

REDUCE TOOL ROOM TIME WITH OUR STANDARD NEST BLOCKS



RECTANGULAR
for flat work
in four heights.



**RIGHT ANGLE
V BLOCK**
in two heights.



**PARALLEL
V BLOCK**
in two heights.

Write

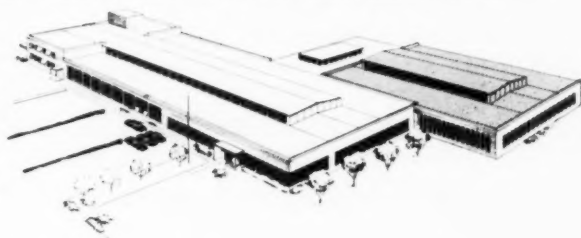
For complete Specifications Literature . . .
Prices and Layout
Templates today!

SUPRECISION PRODUCTS

2447-A NICOLLET AVENUE
MINNEAPOLIS 4, MINNESOTA

Antioch process aluminum foundry increases floor area almost 50%

Floor area of the Yellow Springs, Ohio, plant of Morris Bean and Company's Antioch Process aluminum foundry will be brought to 88,000 square feet by a new addition now under construction. The new area will be in full production by January, 1954.

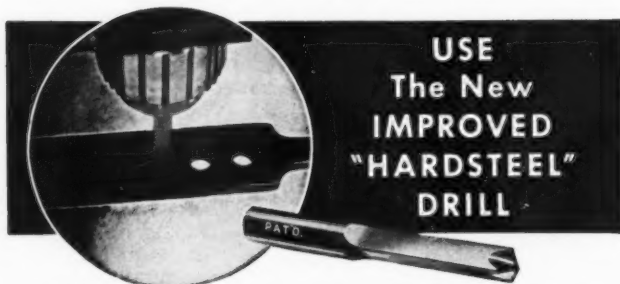


Expands Manufacturing Facilities



Palmer-Shile Company, 16021 Fullerton, Detroit 27, Mich., manufacturers of handling equipment, announce an additional 15,000 square feet of manufacturing capacity known as Plant No. 4. This is the third expansion in the last three years. The company began operations in 1917.

Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counter-boring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

You Harden It—We'll Drill It—
With "HARDSTEEL"

BLACK DRILL COMPANY, INC.

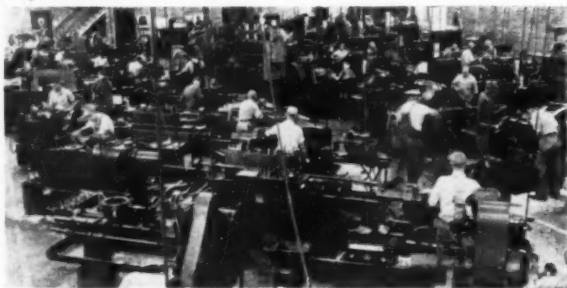
1374 East 222nd St. • Cleveland 17, Ohio

Also makers of—
**BLACK DRILLING
UNITS—AUTOMATIC,
SELF-CONTAINED—
FOR COST-CUTTING
PRODUCTION ON
ALL MATERIALS**

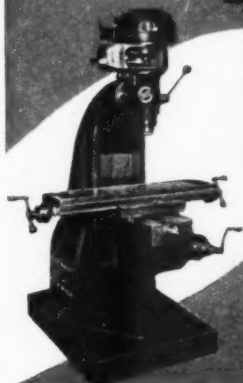
Write for information

Tubular Micrometer Co. starts production in new plant

Tubular Micrometer Co., St. James, Minn., has its new plant addition now in production. It is of the most modern construction, with radiant heating, scientific lighting and ventilation. It will eventually house many of Tumico's precision machining operations in its more than 14,000 square feet of space.



JACKSON - TREE VERTICAL MILLING MACHINE



**For —
NEW SPEED
and ACCURACY**

**A PRECISION
MACHINE TOOL
FOR TOOL ROOMS
AND PRODUCTION**

MFD., U.S.A.

**POWER FEED SPINDLE • TABLE SIZE 9" x 36"
COLUMN TO SPINDLE CENTER — 10 1/2" •
1 H.P. VERTICAL HEAD SWIVELS — 0° TO 90°
AUTOMATIC COLLET CLOSER 3/4" CAP. •
SOME DEALER TERRITORIES AVAILABLE •**

BANSBACH
MACHINERY CO.
MACHINE TOOL ENGINEERS



**ESTebrook 9-0210
221 NORTH CICERO AVENUE
CHICAGO 44, ILLINOIS**

ESTABLISHED 1919

Allegheny expands to produce zirconium

An expanded program for the production of zirconium strip and other shapes for atomic energy applications was announced recently by Allegheny Ludlum Steel Corp., Pittsburgh, Pa. The program is the result of over two years of research and production experience accumulated by the company in melting and shaping zirconium metal.

Le Count moves

The W. G. Le Count Tool Works, Norwalk, Conn., has recently been incorporated as The Le Count Tool Works, Inc., and has moved to larger quarters in Hartford. They make expanding mandrels.

New Dealers & Distributors

Ken Spooner, vice-president of Simmons Machine & Tool Corp., Albany, N.Y., announces the appointment of **Clare Perlin & Associates**, 107 Columbia Ave., Park Ridge, Ill., as midwest representatives,

covering the states of Wisconsin, Illinois and Indiana. The Simmons line comprises large boring and facing mills, and lathes up to 72" swing, as well as machine tool reconditioning service.

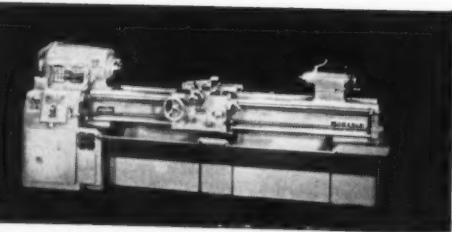
The **Satterlee Co.**, 118 Washington Ave., N., Minneapolis, Minn., has been appointed as a dealer for the Reid precision surface grinder.

The **Simmons Machine Tool Corp.**, of Albany, N.Y., which has provided heavy machinery to the United States, South American, European, and Asiatic markets for over 40 years, has become the exclusive export sales agency for the **Ace-Central States Machine Tool Co.**, Detroit, Mich. The Ace-Central Company designs, builds, and installs complete manufacturing units, including automatic and automation equipment, large jigs, fixtures and supporting tools.

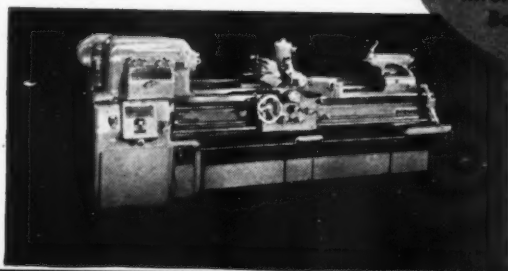
Mosher Industrial Supply Co., 15 Exchange St., Chicopowee, Mass., is the newly appointed distributor for **Penn Scientific Products Co.**, Phila., manufacturers of Spectrum diamond lapping compounds and Pensco wheel laps and wheel dressing tools.



MONARCH FLAME HARDENING



Monarch's
most universal
lathes. Available in
13", 16" & 20" swings,
many lengths, for many
uses. 13" Toolmaker's Lathe
(above). Below, 16" Series
60 Engine Lathe with
Air-Gage Tracer. For
information, request
Brochlet #1113.



GREEN LIGHT

FOR DEAD-CERTAIN TURNING

Figure the job, maybe, to plus or minus .001". Set it up to a gnat's eyebrow. Work out speeds and feeds to the optimum. And what's it all worth—quality- and cost-wise—if bedway wear has begun to warp the lathe's intrinsic trueness?

So it's an absolute "must," for good operation, to have carriage and tail-stock bedways that stand up for the life of the lathe. Like Monarch flame-hardened ways. With Monarch lathes, you get bed castings of strong, dense, wear-resistant nickel-alloy cast iron. You get them flame-hardened to a depth of $\frac{1}{8}$ " plus, to a Scleroscope reading of 70 to 72 Shore—followed by grinding to .0005" (overall). And *that* gives you a lathe with bedways as hard as hardened steel—but with Martensic structure blended into the

tough, fine Pearlitic iron underbody with its retained graphitic carbon. Integration plus! Hardness plus! Lubricant-retention plus!

Our method is more demanding, more expensive. But it gives *you* no worries about uneven wear of loosened steel strips—about different coefficients of expansion—about bed rigidity lost by cutting and drilling for inserts—about abrasion. And it gives *us* unsolicited reports like this: "No appreciable bed wear after over a million cycles!"

The Series 60 Lathes shown here, like *all* Monarch lathes, have Monarch flame-hardened and ground bedways. And more—much more! Write, please *The Monarch Machine Tool Company, Sidney, Ohio.*

FOR A GOOD TURN FASTER . . .
TURN TO MONARCH



Deburring with NOBUR tool

on drill press reduces
production costs... speeds
deliveries!

MEMO

TO: Planning Dept.
FROM: Methods Engineer

NOTE: 75% saving in
time on Op. #4 and
16% in overall time.
Let's take fuller
advantage of
NOBUR

FG. CO.

OUTLINE

OPER NO.	MACHINE	DESCRIPTION	TIME
1	TURRET	BORE & FACE PER PRINT	5 MIN
2	MILL	STRADDLE MILL PER PRINT	3
3	DRILL	10 HOLES LINE DRILL	6
4	BENCH	DE-BURR HOLES	4
4 (REV)	NOBUR TOOL IN DRILL PRESS	NOBUR HOLES	1
TOTAL			19 15

For further information, write or wire today

NOBUR MANUFACTURING COMPANY

717 NORTH VICTORY BLVD. • BURLINGAME, CALIFORNIA

Basco Mfg. Co., Stamford, Conn., makers of the Basco sheet steel separators, announces the appointment of the following distributors to handle the marketing of the company's line of magnetic separators: R. E. Condit Co., 1565 Hopkins Ave., Dayton, Ohio; Brown-Darnell Co., 1024 Oakland Blvd., Detroit 6, Mich; Smith & Klebes Inc., 25 Begelow St., New Britain, Conn.

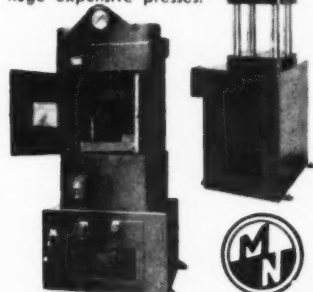
Ernest E. Olds, sales manager, Size Control Co., has announced that Muratet & Co. of Tulsa, Okla., will represent Size Control Co. north of latitude 35° in Oklahoma.

Thomas D. Shadduck X-ray Co., 138 Front Street, Binghamton, N.Y., has been appointed dealer for Broome, Chenango, Cortland, Delaware, Otsego and Tioga counties by North American Philips Co., Inc., 750 South Fulton Ave., Mount Vernon, N.Y.

Cleaver-Brooks Company of Milwaukee announces the appointment of the D. E. McCulley Co., Omaha, Nebraska, as exclusive manufacturer's representatives for the sale of Cleaver-Brooks self-contained boiler equipment.

Designed & Built by **MASTER CRAFTSMEN**

Model 1R-25-50-75-100 ton capacity lower price all purpose press especially designed to replace huge expensive presses.



Model 21—A 1000 ton hobbing press complete with safety guard and maximum pressure regulator. Can also be made for 2000 ton capacity.

M & N HYDRAULIC PRESSES **CAPACITIES FROM 100 to 2000 TONS**

—Meet every demand for accurate die work. They're compact, completely self-contained with pumps and motor in the base.

Free Bulletin 101 completely covers our entire line of hobbing presses.

Complete long range production satisfaction of M & N HYDRAULIC PRESSES stems from more than ten years experience in fulfilling the needs of industry through expert design and controlled manufacture.

Our Presses Are Second To None in Performance

M & N HYDRAULIC PRESS CO.

Designers and Builders of Better Hydraulic Machinery
728 ROUTE 3, CLIFTON, NEW JERSEY

Phone—PRescott 7-0504



Appointments and Promotions

John L. McCaffrey, chairman of the board of the International Harvester Corp., has been reelected a vice chairman of the American Heritage Foundation, it was announced recently by **Henry Ford II**, chairman of the Foundation's board of trustees.

At a recent meeting of the board of directors of the Airway Products, Inc., Pontiac, Mich., **J. L. Stinson** was re-elected president.



J. Doyle DeWitt



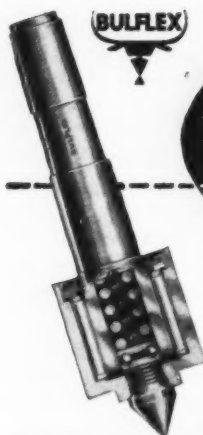
Louis Reiss

Garvin L. Jones has been assigned to the Reliance Electric & Engineering Co., Newark office, 535 High Street. **Thomas J. Lisy** goes to Pittsburgh, making his headquarters at 1030 Park Bldg.

National Research Corp., Cambridge, Mass., has announced the appointment of **James H. Moore** to the position of general manager of Vacuum Metals Corp., wholly owned subsidiary.

Henry D. Sharpe, Jr., president, Brown & Sharpe Mfg. Co., **Herman W. Steinkraus**, president, Bridgeport Brass Company, and **Milton P. Higgins**, president, Norton Co., are among twenty prominent business leaders who have been named as members of the Business and Industry Advisory Committee of the New England Colleges Fund.

Niles-Bement-Pond Co., West Hartford, Conn., has announced the election of **J. Doyle DeWitt** to the board of directors. DeWitt succeeds **Hubert D. Tanner** who until his recent retirement was vice-president of the company. **Louis Reiss** was elected treasurer, succeeding **Richard W. Banfield**, who has been treasurer as well as vice-president.



bulflex
SPRING LOADED
LIVE CENTERS
 FOR GREATER ACCURACY
 PRODUCTIVITY
 LONG LIFE

Bulflex Live Centers eliminate the necessity of delicate adjustment...you save on loading time and need of operator skill. A \$\$\$ saver on repetitive work!

BULFLEX EXCLUSIVES:

- No breakage or premature bearing failure from uncontrolled end thrust
- Scientific distribution of loads minimizes wear
- Thrust bearings are spring loaded—radial bearings take no end thrust
- Guaranteed concentricity
- High speed steel point
- Neoprene oil seal in back
- Only spring loaded live center proven by years of performance

Bulflex Live Center advantages guarantee money saved, trouble-free performance. Write for details!

DISTRIBUTORSHIPS OPEN SOME AREAS

THE bultool COMPANY

Box 5094A Southfield Station - Detroit 35, Mich.



Norwood Webster

Norwood Webster has been named sales representative in the New York area for Riverside Metal Co., Riverside, N.J., producers of specialty alloys. Prior to joining Riverside's sales organization, Webster was employed in a similar capacity by Chase Brass and Copper Company.

George A. Krepps has been named director of inspection for the New Departure Division, General Motors Corp., succeeding **Robert E. Young** who retired recently.



George A. Krepps

CENTER-MIKE AN INSPECTION TOOL THAT...

COSTS YOU NOTHING!



**MEASURES HOLE CENTER
DISTANCES TO .0005" IN 30 SECONDS!**

Center-Mike measures any center to center distance within range—regardless of hole sizes—in thirty seconds without set-up! Yes, this precision center mike **COSTS YOU NOTHING!** It pays for itself in a few weeks, and then goes on paying you a profit each time it's used! Save time—Save money—Your inspection department is not complete without the **CENTER-MIKE**.

**WRITE
FOR
FREE
BULLETIN
652
NOW!**

SORENSEN CENTER-MIKES, INC.
264 KOSSUTH STREET • BRIDGEPORT 8, CONN.



A. J. Jones

Landis Tool Co., Waynesboro, Pa., has appointed **A. J. Jones** as chief engineer. Prior to his appointment, he was in charge of sales engineering.

Dr. Newman W. Thibeault has been named assistant director of research and development in charge of the physical research and microscopic sections by Norton Co., Worcester, Mass. Dr. Thibeault succeeds the late **A. Albert Klein** who died suddenly at his home Aug. 25.



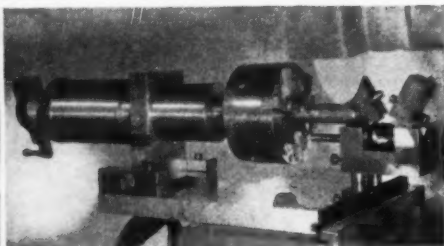
Dr. N. W. Thibeault

**NO SET UP TIME REQUIRED
SIMPLY PLACE ON GRINDER CHUCK OR TABLE**



ROTARY GRINDING ATTACHMENT

- CAPACITY 12" DIAMETER.
- HEIGHT 5"
- MAGNETIC CHUCK 7" DIA.
- MOTOR DRIVEN.
- R.H. ROTATION ON BALL BEARINGS PRELOADED.
- FOR WET OR DRY GRINDING.



THREAD GRINDING FIXTURE

- CAPACITY 4" DIAMETER.
- THREAD LENGTH 2"
- ANY PITCH OR SPIRAL CAN BE GROUND - O.D. OR I.D.
- INTEGRAL WHEEL DRESSER PRODUCES CORRECT P.D.
- HOLLOW SPINDLE FOR CHUCK OR COLLETS.

CAN ALSO BE USED FOR
CYLINDRICAL GRINDING
ON THE SURFACE GRINDER.

2

GREAT NEW TOOLS BY

AMERICAN STANDARD CO., PLANTSVILLE, CONN., U.S.A.



T. C. Smolinski

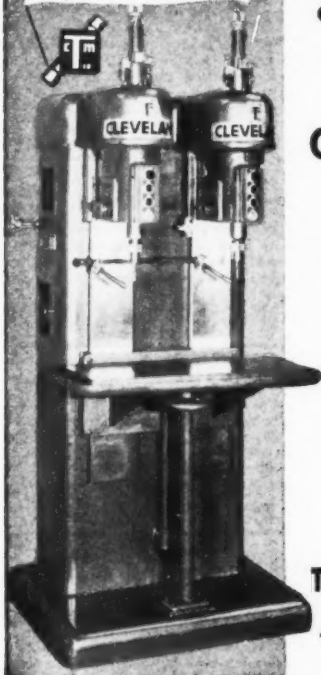
Theodore C. Smolinski has been appointed director of technical service for Wagner Brothers, Inc., Detroit, electroplating warehouse suppliers and manufacturers.

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, announces the appointment of **Dean M. Cochran** as assistant sales manager. In addition to administrative sales activities, Cochran is also named manager of Metalworking and Process Sales Division of H-P-M.



Dean M. Cochran

*Another Cleveland Design
to Speed Production!*



SPEED UP YOUR TAPPING WITH A CLEVELAND DUPLEX!

The Cleveland Model E0 Duplex Lead Screw Tapping Machine does small hole tapping with a speed and precision equal to many larger machines! With separately operated spindles set-up and change-over time is eliminated on many jobs with a wider range of work made possible. Multiple heads for tapping groups of holes may also be used.

Whatever your tapping problems Cleveland has the machine to speed production and cut costs—or can design it for you.

Write for Catalog No. MB-115

THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of
AUTOMATIC STEEL PRODUCTS, INC.
CANTON 6, OHIO

For Better Tapping -- Faster!

CLEVELAND lead
tapping machines screw



Richard F. Dean

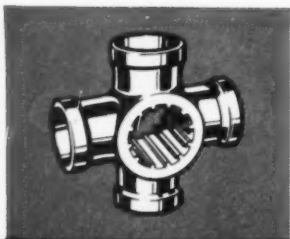
Richard F. Dean has been appointed supervisor of employee relations and training program at Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Earl J. Boyer has joined the Sheffield Corp., Dayton 1, Ohio, as application engineer for the Measuray. This is a non-contact X-ray gage for continuous or intermittent measurement of strip or sheet stock while in motion or stationary.

Reed-Prentice Corp., Worcester, Mass., announces the appointment of **Jerold L. Welch** as chief engineer.

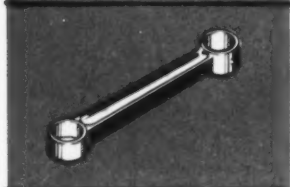


Earl J. Boyer



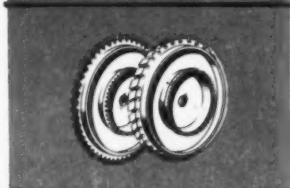
DETROIT BROACH TOOLS PROPELLER HUBS

Detroit Broach tooling for aircraft engine parts began with reciprocal engine designs. A typical example was the Detroit Broach tooling to produce the spline inside propeller hubs. In one pass, broaching produced a complete spline with consistent accuracy. This led to more accurate spline broaching in many other fields, too.



DETROIT BROACH TOOLS ARTICULATING RODS

As radial engines came to the forefront, new challenges in precision tooling were met by Detroit Broach ingenuity. Typical of reciprocal engine parts broached were articulating rods. Detroit Broach tooling produced a better finish and greater accuracy on the machined surfaces of these parts.



DETROIT BROACH TOOLS TURBINE AND COMPRESSOR WHEELS

With the advent of jet engines, the need for close-tolerance repetitive accuracy was even more acute. In addition came the problem of working with high-alloy, heat-resistant, tough-machining metals. Compressor and turbine wheels are typical of the parts for which Detroit Broach tooling is meeting all requirements with flying colors. Varied forms of slots are produced in these wheels, square, at helix and at conical angles to the axis.



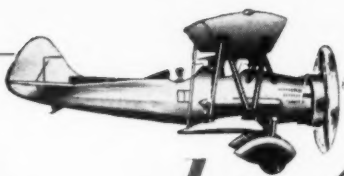
DETROIT BROACH TOOLS TURBINE AND COMPRESSOR BLADES

Mating parts to compressor and turbine wheels, the compressor and turbine blades are two more parts on which Detroit Broach tooling turned the trick. Intricate "Christmas Tree" forms, dovetail and "Ball Root" forms are easily produced with accuracy. At the same time, production costs are rock-bottom and surface finishes generally need no further machining.

This is a view of the new, ultra-modern Detroit Broach plant and offices located in Rochester, Michigan—just outside Detroit. Designed by Sture Frolen, eminent Swedish architect, it em-

bodies many important advancements that contribute to employee morale and manufacturing efficiency. Another example of the unusual facilities of Detroit Broach Company.





Broaching Pioneers

IN THE AIRCRAFT INDUSTRY



Since the price of poor fits on engine parts may be paid in human lives, the aircraft industry was quick to recognize and adopt the inherent accuracies of broaching.

It was quick, too, to recognize the ability of Detroit Broach to engineer and produce tooling that met the need for concise repetitive accuracy . . . tooling with important production economies as shown on the opposite page.

in YOUR industry, too you will find many

examples of Detroit Broach tooling that is producing repetitive accuracy, part after part after part. Just as important, it is tooling that consistently makes good common sense in terms of efficient operation and rock-bottom cost-per-piece broached.

These benefits that accrue Detroit Broach customers are not achieved by magic or by gift. They are the result of years of specialization in one important field . . . broaching. Every person, every machine, even plant facilities at Detroit Broach are geared to that single purpose.

In broaching it will pay you, too, to have a talk with Detroit Broach Company . . . pioneers in broaching yesterday, today, and tomorrow.

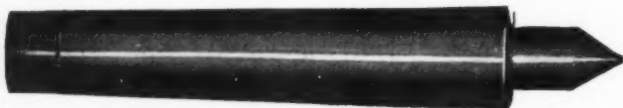
Detroit Broach COMPANY
ROCHESTER, MICHIGAN

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

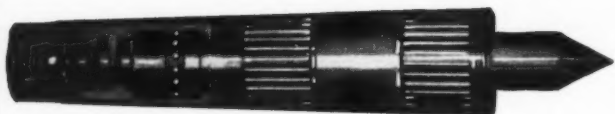
CONCENTRIC
SPRING LOADED

LIVE CENTER

**THE ORIGINAL
SPRING LOADED
LIVE CENTER**



**FASTER
SPEEDS**



**AUTOMATIC
THRUST
ADJUSTMENT**

Patent No. 2,520,473

**Operates 4 - 5 times faster than ordinary live centers.
Less overhang . . . means more rigidity, more working range.
Spring loaded spindle gives automatic tail stock adjustment.**

WRITE TODAY FOR COMPLETE INFORMATION!

CONCENTRIC TOOL CORP.

2970 Huntington Drive
San Marino, California



John D. Tebben

John D. Tebben, well-known management consultant, has been elected president and chairman of the board of the recently organized Wagner Brothers Equipment Co., which started operations in June, at 42056 Michigan Ave., Wayne, Mich.

The firm was formed by a group of employees of Wagner Brothers, Inc., manufacturers and warehouse suppliers to the plating industry, and will build electroplating equipment.

Officials of the Pivot Punch and Die Corp., North Tonawanda, N.Y., announce the promotion of **Edmund J. Klonowski** to general sales manager of all divisions of the corporation, and the appointment of **Frederick J. Rueger** to the new position of director of cost planning for all divisions.

Detroit Broach Co., Rochester, Mich., has announced the election of **E. H. H. Graf** as vice-president in charge of sales.

The Sharples Corp., Philadelphia, centrifugal and process engineers, announce the appointment of **Fred W. Stakelbeck** to the post of executive vice-president.



E. J. Klonowski



E. H. H. Graf



Frederick J. Rueger

famco

OPEN BACK INCLINABLE

POWER PRESSES



15 bench and floor models 3 to 18 tons capacity. Left: Model 59 Electromatic 18 Ton Press with exclusive Solenoid operated clutch.

In an unusually short time Famco has become the nation's leading manufacturer of small O.B.I. presses. In addition to offering the largest line of precision-built presses on the market, Famco recently introduced the revolutionary Electromatic Clutch. This feature, built into its 13 and 18 Ton models, utilizes the instant action and increased efficiency of an electrically operated 9-point jaw clutch. Every care has been taken to make this the most rugged, highest quality line available. For complete details see your Famco Dealer or write for free Catalog.

FAMCO MACHINE COMPANY

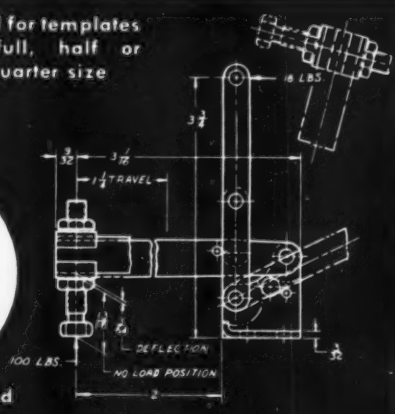
3118 SHERIDAN ROAD • KENOSHA, WISCONSIN

AIR PRESSES • ARBOR PRESSES • BAND SAWS • DRILL PRESSES
FOOT PRESSES • POWER PRESSES • SQUARING SHEARS

ANNOUNCING **Our New Baby** A **MIDGET CLAMP**

UNBELIEVABLY STRONG, WITH PERFECT FEATURES
100 lbs. clamping force with spindle at end of toggle bar!

Send for templates
in full, half or
quarter size



Model V-100

Also side-mounted
Model S-100

100 LBS.

18 LBS.

3 7/8"

3/16"

1 1/2" TRAVEL

DEFLECTION

NO LOAD POSITION

2"

Sales offices in principal cities

**KNU-VISE
PRODUCTS**

LAPEER MFG. CO.

3052 DAVISON ROAD • LAPEER, MICHIGAN

WESTERN DIVISION—422 MAGNOLIA • GLENDALE, CALIF.
CANADIAN DIVISION—HIGGINSON ENGR. • HAMILTON, ONT.

The appointment of William E. Mahin as technical director of Vanadium Corp. of America was announced recently. Mahin formerly was director of research for the Armour Research Foundation. He will direct the technical and research activities of Vanadium Corporation which is erecting a \$1,000,000 research center at Cambridge, Ohio, where it operates a new aluminum and ferro alloy producing plant.

James Burnham Duke has joined Elastic Stop Nut Corp. of America, Union, N.J., as technical assistant to the general sales manager.

R. C. Ingersoll, president of Borg-Warner, has announced that E. S. Russey, president of Warner Gear Division, has reluctantly agreed to release T. J. Ault from the position of vice-president and purchasing agent of Warner Gear so he could accept the promotion awarded to him as vice-president and assistant general manager of Detroit Gear Division.

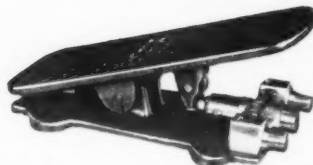
The assignment of Thomas B. Thomas to the St. Louis branch sales office of Monsanto Chemical Company's Organic Chemicals Division has been announced.

AIR DEVICES BY **Redmer**

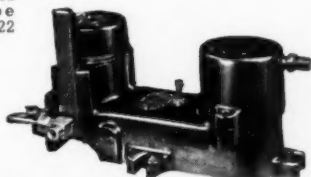
REDMER INDEX CHUCK WITH AIR OPERATED COLLET



The Redmer Index Chuck Model No. RC-5 has 12 indexing positions and collet capacity of 1/16" to 2". Uses Brown & Sharpe type collets No. 22 and No. 11.



The Redmer Foot Control and Valve reduces operator fatigue in all cases where air control is necessary. Valve is a brass casting which can be removed and used as a separate unit with cam operations. Foot Control No. FC-28. Valve No. V-29.



The Redmer Collet Air Chuck is an air operated collet holding fixture using Brown & Sharpe type collets. Ideal for drilling, milling, threading and for assembly work. Equipped with air ejection for oil flushing. Capacities 1/16" to 3 1/2".

REDMER AIR DEVICES, INC.

Box 247
9128 W. Belmont

Guntersville, Alabama
Franklin Park, Illinois

Write for literature and prices



John T. Farrell

Lipe-Rollway Corp., Syracuse, N.Y., manufacturers of heavy duty automotive clutches, announce **C. B. Spase**, former chief engineer, was appointed chief engineer of automotive development, responsible for all automotive research. **Robert S. Root**, assistant chief engineer, succeeds Spase.

W. L. Neely, tax supervisor of Rockwell Mfg. Co., and **John T. Farrell**, supervisor of the firm's headquarters accounting department, have been appointed assistant controllers.

C. H. McCollam, general manager of sales, the steel and tube division of The Timken Roller Bearing Company, has announced the promotion of **Harry B. Lilley** as manager of the steel and tube division district office in Detroit. **John J. McGrann** was promoted from sales engineer to manager of the Houston office to succeed Lilley. Lilley replaces **L. W. Eppler**, who has resigned to start his own automotive parts manufacturing company.

Russell J. Dickson has been appointed general sales manager, Leschen Wire Rope Division of H. K. Porter Co., Inc., St. Louis.



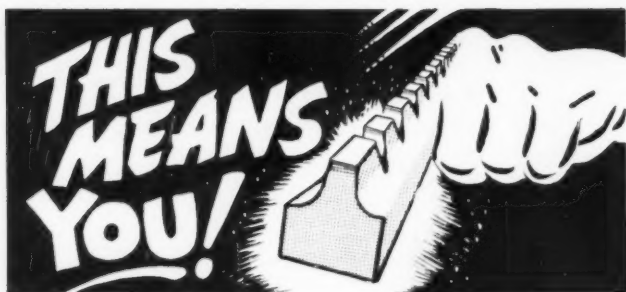
C. B. Spase



W. L. Neely



Robert S. Root



Yes, sir! With these
 du Mont *Minute Man*® Keyway Broach Kits



You can cut
 keyways from 1/16" to 1"
 in bores from 1/4" to 3"
 in gears, milling cutters, pulley
 hubs, collars, couplings, etc., etc.

IN ONE MINUTE
for as little as ONE CENT EACH

CATALOG AND PRICE LIST COUPON

The du MONT CORPORATION, Greenfield, Mass.

Please mail folder and price list T on
Minute Man Keyway Broaches and Kits to

Name.....

Company.....

Address.....



Whitfield J. Bell

Whitfield J. Bell, Norton Company abrasive engineer in Maryland and Delaware, has retired after 38 years with the company. **David H. Paul** will take over the territory. Bell first came to Norton in 1915. Paul has been a field engineer.

Ray Kensel has been named district sales manager for Cleco Air Tool Division of Reed Roller Bit Company for the Detroit, Cleveland, Cincinnati, and Indianapolis area, replacing **B. O. Stoothoff** who has resigned.



David H. Paul

"RFC"

ROLL FEEDS

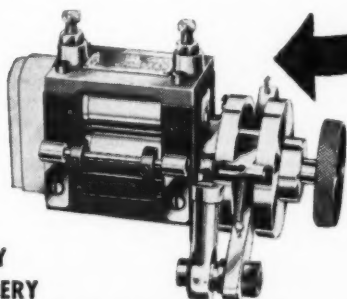
FITS ANY PRESS . . . bench or pedestal type high speed power presses. For side or rear feeding. Furnished complete with adjusting disc, mounting bracket and connecting linkage.

CAN'T SLIP . . . each wedge has 4 points of contact to safeguard accuracy.

REVERSES INSTANTLY . . . and easily. Merely shift feed finger spring from one lug to the other.



Ready for mounting!
Furnished complete.



**EARLY
DELIVERY
ON STANDARD MODELS.**

FEEDS IN THOUSANDS . . . RFC Roll Feeds assure amazingly accurately stock movement.

MAINTAINS ORIGINAL SETTING . . . regardless of use or wear. No ratchets or pawls to wear down and "throw off" feed spacing.



ROLL-FEEDS CORP.

An Electrix Affiliate

Pawtucket • Rhode Island

Write today for latest Bulletin



Donald H. Krans

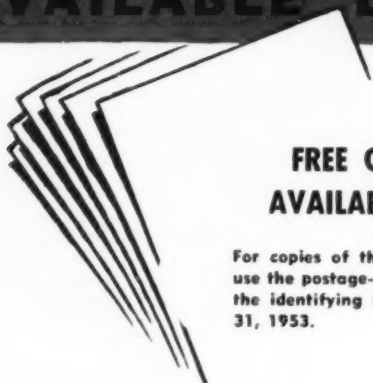
The appointment of **Donald H. Krans** as director of their new laboratory has been announced by The Trane Company, La Crosse, Wis., manufacturers of heating, air conditioning and heat exchange equipment.

Thomas H. Wagner has been elected president and general manager of the Rite-O Tool and Gage Co., Hazel Park, Mich. Wagner has resigned his office as treasurer of Campbell, Wyant and Cannon Foundry Co., Muskegon, Mich., to accept the new position.



Thomas H. Wagner

AVAILABLE LITERATURE



FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest, use the postage-paid postcard on the next page. Merely circle the identifying numbers and mail the postcard before Dec. 31, 1953.

1. Grinders, Wire Crimping Wheels, Patterns. Catalog No. 353, Mummert-Dixon Co., 122 Philadelphia St., Hanover, Pa., covers wire weaving looms and auxiliary equipment, wire crimping wheels, plurality oilstone tool grinders, suspended swing frame grinders, radial grinders, facing & boring heads, and patterns. Illustrated, pocket-size.

2. Tool Holder brochure describes Marvel tool holder, American Standard Co., Plantsville, Conn. Illustrates both right and left hand use; setup time said to be reduced. Rigid and parallel alignment assured. Marvel No. 1 is for 9" lathes, and No. 2 for 12" lathes.

3. Drilling Machine. To describe their No. 21 back-gear 8-speed drilling machine, Buffalo Forge Co., Dept. BB, Buffalo 5, N.Y., and its affiliate, Canadian Blower & Forge Co., Ltd., Kitchener, Ont., have issued Bulletin 3746A. For general machine shop and maintenance work, machine has three feeds, direct or back-gear drive, and lever and hand wheel feeds.

4. Diamonds for Industry. Catalog No. 1, Parsons Diamond Products, Inc., Dept. BB, 968 Farmington Ave., West Hartford 7, Conn., shows their complete line of diamond tools and diamond abrasives. Included are sections on single point dressing tools, cluster and impregnated dressers, radius and form wheel dressers, shaped diamond tools, diamond wheels.

5. X-ray Analysis. "X-ray Analysis—Three Way Tool of Industry" is available from the Research & Control Instruments Div., North American Philips Co., Inc., Dept. BB, 750 S. Fulton Ave., Mount Vernon, N.Y. Text of 6-page folder gives com-

plete explanation of the procedure used in production control and in laboratory applications.

6. Dust and Fume Eliminators, two of the Centri-Merge vertical rotor wet type, are described in Bulletin VU-8-53, Schmieg Industries, Inc., P.O. Box 4701BB, Detroit 2, Mich. One is for wet collection and elimination only, and the other is a combination primary dry and secondary wet collection and elimination unit.

7. Contour Milling Cutter. Engineering Bulletins No. 6 and 7, Douglas Tool Co., Dept. BB, 2300 E. Nine Mile Rd., Hazel Park, Mich., describe Hi-Helix contour milling cutters, said to give longer tool life, reduced cutter breakage, improved workpiece finish. Results of cutter tests performed on titanium alloy 150-A are given.

8. Metal Cutting Saw, the Peerless Hydra-Cut, Peerless Machine Co., Dept. BB, Racine, Wis., is described in Bulletin HC50. Features are detailed and illustrated. Specification tables included.

9. Drills, Grinders, Screwdrivers, Nut Setters, products of Thor Power Tool Co., Dept. BB, 175 N. State St., Aurora, Ill., are contained in Catalog No. JE-1660. Thor No. 2 series tools weigh from 1 lb. - 1 oz. to 2 lb. - oz. Speeds from 850 r.p.m. to 14,000 r.p.m.; choice of pushbutton, lever, or pistol grip throttle.

10. Materials Handling Trucks, 32 different types, are listed in Booklet 53-S, Nutting Truck and Caster Co., Dept. MTB, 1467 W. Division St., Faribault, Minn. Specifications and descriptions include pertinent product data plus how-to-use-it information.

11. **Decimal Equivalent, Tap and Screw Thread Chart**, printed on grease- and dirt-resistant vinylite, will be sent upon request by Reiff & Nestor, Dept. BB, Lykens, Pa.

12. **Deburring, Die and Mold Polishing**, blending grind lines to scale removal honing of cutting tools and pre-plating cleaning with both regular and high velocity Pressure Blast wet-blasting equipment are treated in an 8-page booklet issued by the Cro-Plate Co., Inc., Dept. MTB, 747 Windsor St., Hartford 5, Conn.

13. **"Meehanite Metal as a Gear Material,"** Bulletin No. 42, Meehanite Metal Corp., Dept. B, New Rochelle, New York, describes and illustrates gear applications, gear casting design. Provides engineering properties of metal used in gearing.

14. **"A Half-Century of Experience in Training Machinists"** is an analysis of the operation of the apprenticeship system of the Kearney and Trecker Corp., West Allis, Wis. Distributed by the Publications Branch, Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D.C.

15. **Wheel Lathe**, Bulletin 3101, Consolidated Machine Tool Corp., Dept. MTBB, Rochester 10, N.Y., simply and effectively tells the story of the Sellers tracer control wheel lathe, said to be designed to simplify, shorten or eliminate non-cutting operator motions.

16. **Diamond Tools** for cutting blanks and holes—including drills, grinding wheels, cutting discs and saws, combination tools, countersinks, internal grinders, laps and hones, and milling tools—are listed in brochure of Linson Tools Ltd., England. Distributor, Douglas Export-Import Corp., Dept. BB, 17 Battery Place, New York 4, N.Y.

17. **Screw Machine Products**. Planning development, engineering, and processing to packaging and shipping problems are illustrated in detail in booklet of A & W Machine Products, Inc., Dept. C-17, 5100 St. Clair Ave., Cleveland 3, Ohio. Photographs approach three dimensional visibility.

18. **"People Work Better When They See Better"** describes the Magni-Focuser, third-dimensional binocular magnifier, Edroy Products Co., Dept. BB, 480 Lexington Ave., New York 17, N.Y. Magnifier is said to speed production, cut costs and insure greater accuracy.

19. **"Design-and-Build"** dramatizes trend toward completely automatic manufacturing equipment and the combining of basic services in creating automatic machinery and special tooling for modern production lines. Describes services and facilities made available by Ace-Central

States Machine Tool Co., 3801 Trenton St., Detroit 10, Mich.

20. **Paste Solder and Brazing Alloys** are subject of booklet issued by Fusion Engineering, Dept. MTB, 4504 Superior Ave., Cleveland 3, Ohio. Chart illustrates melting ranges of each solder and brazing alloy type; color-coded to indicate whether alloy is designed for electrical or mechanical connection.

21. **Bond for Organic Finishes**. Pamphlet A-108, Turco Products, Inc., Dept. BB, 6135 S. Central Ave., Los Angeles 1, Calif., describes Turcoating materials. Includes phosphating reference chart outlining purpose of phosphate coatings, government specifications met by Turcoating materials, recommended uses, methods of application, equipment required, etc.

22. **Coolant Cooler**, Bulletin No. 502, Frostrode Div., Viking Products, Dept., MT, 3066 E. Outer Drive, Detroit 34, Mich., features the Frostrode coolant cooler, said to give greater production economy, greater tool life, and better finishes.

23. **Dust Control** in metalworking industries is discussed in Bulletin 392, American Wheelabrator & Equipment Corp., 1172 S. Byrkit St., Mishawaka, Ind. Attention is given to the use of high-efficiency cloth-tube-type dust collectors in the ventilation of grinding and annealing operations, sprue mills, and blast cleaning equipment.

24. **How to Insure S. A.** (safe arrival) is told in brochure of Acme Steel Co., Dept. B, 2840 Archer Ave., Chicago 8, Ill. Covers steel strapping, wire stitching.

25. **Blind Rivets**, Townsend Co., Dept. MB, New Brighton, Pa., has issued Catalog TL-76, describing Cherry blind rivets. Rivets are installed by one man from one side of the work and are said to be comparable to conventional rivets in strength and installation speed.

26. **Three-Dimensional Shop Planning**, Bulletin 5301, South Bend Lathe Works, Dept. BB, South Bend 22, Ind., tells of a model planning kit available to shop officials on a free-loan basis. Illustrated are scale models of all South Bend machine tools, which can be used to forecast errors in spacing for free traffic flow, operator ease and good lighting before machines are set.

27. **Push Button Assembly** for panel mounting is subject of Data Sheet 77, Micro, a division of Minneapolis-Honeywell Regulator Co., Dept. MB, Freeport, Ill. The IPB4 push button assembly is said to be extremely small, sealed at panel, and easily installed.

28. **Scientific Method Proceedings**. Proceedings of the tenth annual Machine

THIS HELPFUL LITERATURE NOW AVAILABLE

Design Conference are available in printed form at \$2 per copy—Cleveland Eng. Soc., Dept. B, 2136 E. 19th St., Cleveland 15, Ohio. Among papers presented were "Methods of Automation," C. F. Hataut, Hataut Eng. Co., Detroit; "Operations Research," R. L. Ackoff, Case Institute of Technology, Cleveland; and "Methodical Approach to Mechanisms," H. Ziebolz, Askania Regulator Co., Chicago.

29. Grinding, Filing, scraping, honing, lapping, polishing techniques are discussed in the Di-Profiler folder of Engis Equipment Co., Dept. MT, 431 S. Dearborn St., Chicago 5, Ill. Photographs show Di-Profiler in the process of finishing internal holes, irregular dies, convex and concave surfaces, tool edges, internal and external tapers, shoulders and recesses, scraping and other operations.

30. Vertical Rotary Rigidmil, Sundstrand Machine Tool Co., Dept. BB, Rockford, Ill., is described in new booklet. Included are features of the machine, machine cycles, specifications and dimensions.

31. Semi-Live Skid Truck literature describes a rider type, narrow aisle, electric powered truck for handling semi-live skids—The Raymond Corp., 37113 Madison St., Greene, N.Y., bulletin No. 718-X. Contains installation photographs, specifications, and dimensions.

32. Die Sets are subject of 24-page catalog of Superior Steel Products Corp., Dept. MB, 2754 S. 19th St., Milwaukee, Wis. Aimed at solving die set handling problems from bench to press.

33. Silicone Rubber Products bulletin including diaphragms, gasketing, sheet packing, oil seals, rings, insulation tape, rod and valve stem packings, and molded shapes for many industrial uses has been issued by the Garlock Packing Co., Dept. BB, Palmyra, N.Y. Bulletin AD-147.

34. Industrial Truck. Three bulletins covering the Transveyor Stacker, riding-type electric industrial truck designed for close-quarter narrow-aisle operation are available from the Automatic Transportation Co., Dept. B, 149 W. 87th St., Chicago 20, Ill. Contain specifications for the 2000-, 3000- and 4000-pound capacity trucks in the Transveyor Stacker series.

35. Decohm Products catalog, Davis Electric Co., Dept. MTB, 230 N. Spring St., Cape Girardeau, Mo., lists technical data regarding molded coil type open relays, hermetically sealed canister type relays and television deflection yokes. Informa-

tion on operating characteristics, range and sensitivity.

36. Measuring Wall Thicknesses of metals and other materials and locating internal defects are treated in Bulletin 1010, J. W. Dice Co., Dept. BB, 1 Engle St., Englewood, N.J. Booklet describes Model MS-101 Ultrasonic Metroscope.

37. Maximum Allowable Stress Values for ferrous pipe and tubing is shown on data card issued by Sales Office BB, Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa. Complete with notes and formulae for calculation of maximum allowable working pressures of tubing and pipe; ask for TDC-154.

38. New Grade of Cast Alloy. Catalog VR-451, Vascoloy-Ramet Corp., Dept. MTB, Waukegan, Ill., introduces Tantung 144 to the metal cutting tool field. Alloy is for use where resistance to abrasion in cutting is important, and where absence of shock or impact is a factor.

39. Drilling and Reaming. Folder and data sheets of Drillunit, Inc., Dept. MT, 635 Mt. Elliott, Detroit 7, Mich., describes the Drillunit, a long stroke unit for push-button drilling and reaming—single or multiple installations. Can be mounted on a machine in any position.

40. Industrial Flooring. "Plastic Pellets" by Flash-Stone Co., Dept. MT, 3723 Pulaski Ave., Philadelphia 40, Pa., explains the properties of plastic pellets in an asphalt-rock mixture for industrial flooring. Used in two types of flooring material—Immediate Set and Lignite. Characteristics of each type are described.

41. Brass Rod Mill Depots for quickly supplying brass rods, fabricated parts and other brass products are described in 4-page folder of Customer Service Division BB, Titan Metal Mfg. Co., Bellfonte, Pa. Pictures 3,000,000 pounds of brass rods maintained in depots for quick delivery.

42. Crane Truck with a capacity of 6000 lbs. at seven-ft. radius is detailed in folder issued by the Elwell-Parker Electric Co., Dept. B, 4205 St. Clair Ave., Cleveland 3, Ohio. Engineering drawings give specifications. Application photos show truck handling various loads.

43. High-Slip Motor for punch press service is described in G. E. bulletin. Publication discusses design of the Type KRX motor and explains how an extended bar rotor helps reduce problem of rotor heat.

44. Possibilities with Fatty Alcohols. Booklet that tells how to use Cachalot

SENT FREE UPON RETURN OF POSTAL CARD

cetyl, oleyl, and stearyl alcohols in various applications is available from M. Michel and Co., Inc., Dept. MTB, 90 Broad St., New York 4, N.Y. Of particular interest is the use of these products in cutting oils.

45. Industrial Filters featuring continuous, full-flow, self-cleaning, fully automatic disposable belt-type filtration are detailed in bulletin by Industrial Filtration Co., Dept. 290, Labanon, Ind. Applications of Delpark filters include filtration of quenching oils, coolants, paint spray booth water.

46. Double Circle Tools, product of Chicago-Latrobe Twist Drill Works, Dept. MT, 411 W. Ontario St., Chicago 10, Ill., are listed in General Catalog No. 51. Contains 152 pages designed for quick reference with a useful technical data section. Specifications, description, and engineering information included.

47. Control Valves. Condensed Catalog No. 531, C. B. Hunt & Son, Inc., Dept. MTB, Salem, Ohio, describes the Quick-As-Wink line of air and hydraulic control valves, valve couplings, etc. Shows sectional views of body, plunger, packing and interior operation.

48. Chemicals for metal processing and finishing are listed in catalog of Klem Chemicals, Inc., Dept. MB, 14401 Lanson

Ave., Dearborn, Mich. Contains comprehensive application chart for surface preparation of ferrous and nonferrous metals.

49. How to Apply better zinc phosphate coating to steel in preparation for painting is told in leaflet issued by Oakite Products, Inc., Dept. BB, 19 Rector St., New York 6, N.Y. Presents story in a concise, readable attractive way.

50. Speed Reducers. Westinghouse Electric Corp., Box 2099-BB, Pittsburgh 30, Pa., has made available Speed Reducer Booklet B-5646. Features of the equipment, manufacturing techniques, and applications are discussed. Standard ratios available for all types of speed reducers are given.

51. Aluminum Alloy. Lurium, said to be a new lightweight, high purity aluminum with a permanently lustrous high finish, is described in bulletin of Fromson Orban Co., Inc., Dept. B, 205 E. 42nd St., New York 17, N.Y. Table of chemical composition and physical properties included.

52. Materials Control for small plants is subject of Leaflet No. 35, Small Business Administration, Dept. BB, Wash. 25, D.C. Answers questions on organization and planning, procedures and records.

53. Soft Metal Deburring. Two standard Maizoo Blast machines for the production

FIRST CLASS
PERMIT NO. 272
SEC. 34.9, P.L. & R.
WHEATON, ILLINOIS

BUSINESS REPLY CARD

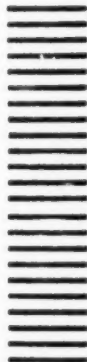
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

2c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



deburring of a variety of soft metal parts are described in Bulletin No. 103-57, Modern Industrial Eng. Co., Dept. MB, 14230 Birwood Ave., Detroit 4, Mich. Model MA-24—continuous operating machine; Model MA-1—stationary unit.

54. Broach bars and Fixtures for jet automotive and allied industries has been released by Cleveland Broach, Inc., Dept. B, 1061 E. 260th St., Cleveland, Ohio. Emphasizes speed, lower production costs and savings obtainable through the use of modern broach bar and fixture tooling. Title of booklet—"Cleveland Broach Bars and Fixtures."

55. Applications of Hydraulic and Pneumatic Power Systems are pictured and described in 4-page brochure, The Rucker Co., Dept. MTB, 4228 Hollis St., Oakland 8, Calif. Industries range from agricultural, canning and lumbering through automotive, aviation and marine to construction, chemical and metalworking.

56. Lathe and Grinding Machine Center Tips and Colmonoy tips for centerless grinder blades are described in Bulletin No. CT-10, Wall Colmonoy Corp., Dept. BB, 19345 John R. St., Detroit 3, Mich. Lists specs and prices for 48 sizes of lathe and grinder center tips cast from wear resisting Colmonoy No. 6 alloy.

57. Weld Standards. Standards to enable engineers to communicate information for cost and quality control of welding pro-

cedures. Set of 19 sheets on tracing paper in loose-leaf binder. Gives standards for guaranteeing butt and fillet welds in all plate thicknesses. Price \$1 per set. Lincoln Electric Co., Dept. MBB, Cleveland 17, Ohio.

58. Clad Metal Inventions. Pamphlet describing nine new developments has been announced by Knapp Mills Inc., 23-BB Borden Ave., L.I., N.Y. Information on Cupralum anode, Ferrolum anode, Ferrolum lead clad steel immersion heater, Knapp lead-plate heater, Universal pipe supporter, automatic lead cladding machine, Raysist compounds, Lead-Lube, and Guidler.

59. Steel Frame. Catalog of Multi-A-Frame Div., Ainsworth Mfg. Corp., Dept. BB, 1471 E. Atwater St., Detroit 7, Mich., contains installation photographs, illustrations and information on various types and sizes of channel frame and fittings, engineering data charts, how and where to buy.

60. Magnesium, lightest of the commercial structural metals, is subject of "Magnesium Plate and Sheet to Reduce Weight," folder of Brooks and Perkins, Inc., 1980-BB W. Fort St., Detroit 16, Mich. Describes dimensions, tolerances of different grades of products; compares gages required for equal stiffness in sheet magnesium, aluminum, brass and steel.

Tear Off and Mail This Postage-Paid Postal Card

MACHINE and TOOL BLUE BOOK

OCTOBER, 1953

Please send the following literature which I have encircled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
52	53	54	55	56	57	58	59	60								

NAME..... POSITION.....

COMPANY.....

STREET.....

CITY..... ZONE..... STATE.....

save time

ENGRAVE

in your own shop



*Lowest set-up time
for unskilled labor*



CALIBRATIONS



PROFILES



CURVED SURFACES

10,000 IN USE Accepted by all leading manufacturers as the speediest, most versatile portable engraver. Only the NEW HERMES has these patented features:

- Adjustable for 15 ratios.
- Self-centering holding vise.
- Automatic depth regulator.
- Adjustable copy holders.

Send for Catalog No. 28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.).

NEW HERMES ENGRAVING MACHINE CORP.

13-19 University Pl., New York 3, N. Y.

Shims stamped from LAMINUM® look like solid metal but actually are made up of layers of .002 or .003 inch brass or steel.



when a shim is
LAMINATED
here are your advantages:

REDUCED MACHINING COST: You machine only to easy tolerances. The laminated shim is *adjustable*—you simply peel laminations to get exactly the spacing you need.

SPEEDED PRODUCTION: Final fitting can be done right at the job. You don't have to take parts back and forth for further machining, grinding or filing.

SIMPLIFIED USE: Shims come to you in one "pack" for each application. They are precision-stamped to your exact specifications. No counting, no stacking, no miking.

ADDED SERVICE FEATURE: Throughout the life of the machines you produce, the simple removal of a shim lamination provides a unique adjustment for the take-up of wear.

LAMINUM

THE SOLID SHIM THAT *PEELS* FOR ADJUSTMENT

LAMINATED SHIM COMPANY, Inc.

8611 UNION STREET

GLENBROOK, CONN.

CUSTOM SHIMS

STAMPINGS

SHIM STOCK



Calvin Tittler

Calvin W. Tittler of Leetonia, Ohio, has been appointed Eastern and Southern regional sales manager for Deluxe Saw and Tool Co., High Point, N.C., a subsidiary of Rockwell Mfg. Co.

George S. Steyskal, recently appointed factory manager, heads up the new service department of Standard Tool & Mfg. Co., Detroit. Over 2,000 sq. ft. of floor space has been added recently.

The appointment of Darwin S. Weist as chief engineer was announced recently by St. Paul Hydraulic Hoist, Minneapolis, Minn.



George C. Steyskal



*★ Star Performer
In The Reamer Field*

Staples

CARBIDE-TIPPED

SHELL TYPE EXPANSION REAMER*

For maximum tool life with minimum tool servicing, put this Staples Shell Type Expansion Reamer on the job. Tool is returned to original diameter simply by driving the shell up the tapered arbor. Tool can be expanded many times without a re-grind. To obtain a new tool, just order a new shell—a standard stock item.

Standardize on Staple Carbide-Tipped Circular Cutting Tools. You'll get longer tool life—greater accuracy—finer hole finish—and spend less time on tool servicing. Staples is the **quality** name in carbide tool production. You'll save money in the **long** run with Staples.

*Patented.

THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio

Distributors in Major Cities

Staples

CARBIDE-TIPPED CUTTING TOOLS

*A complete line of Circular Carbide-Tipped Cutting Tools
Expansion Reamers — Special Tools*



S. G. Kern

S. G. Kern has been named manager of the Denver office, KSM Products, Inc., Room 234, Commonwealth Bldg., Denver 2, Colo., and **Robert F. Chapman** has been named manager of the San Francisco office, 785 Market Street.

Bryant Machinery & Eng. Co., Chicago, widely known machine tool organization, announces the appointment of the following corporate officers: **Martin J. Wiora**, president; **Charles B. Tansley**, executive vice-president; **Robert A. Cole**, vice-president; **Daniel F. Laffey**, secretary; **Martin J. Wiora, Jr.**, treasurer.



Robert F. Chapman

GOING AROUND IN CIRCLES?

NO NEED TO IF
YOU RELY ON

**PRECISION
ARTS** by....



Eliminate guesswork in Tooling, Retooling
and Replacement of **MULTIPLE SPINDLE
DRILLING EQUIPMENT**

Fabricated from highest quality metals and machined to exacting standards, Seibert and Sons products are made in the **only** plant ever built in this country devoted exclusively to the manufacture of spindles and component parts on a mass-production basis. Through specialization, **quality** has become an integral part of every Seibert unit made. **Lower prices** and **immediate delivery** enables Seibert to save you both **money** and **time**.

Write for your free catalog and price list today.



(1) Shur-Lok Adapter Assemblies (2) Slip Spindle Assemblies (3) Universal Joints (4) Lower Joint

Assemblies (5) Upper Joint Assemblies (6) Pinion Drive Shafts (7) Bracket Spindle Assemblies (8) Arms.

SEIBERT

& SONS, Inc.

Quality

CHENOA, ILLINOIS



Robert E. Sanford

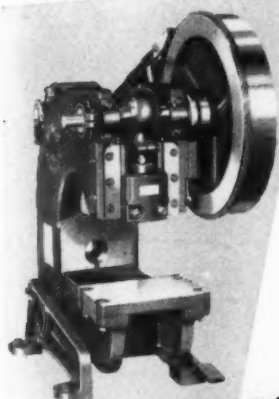
Clearing Machine Corp., Chicago power press manufacturer, recently announced that **Robert E. Sanford** has joined their staff of engineering consultants. Among Sanford's duties will be working directly with customers to provide them with the necessary engineering help in planning the manufacture of closed die forgings.

Charles C. Reiff, chief engineer of the Rockwell Mfg. Co., Barberton, Ohio, plant, has been promoted to chief engineer of the company's Delta Power Tool Division at Bellefontaine, Ohio.



Charles C. Reiff

\$ // \$ // \$ // \$ // **THE PRESS** **\$ // \$ //** **THAT PUNCHES** **OUT PROFITS** **\$ // \$ //**



KENCO

KENCO 4 and 5 TON PUNCH PRESSES are built with precision and ruggedness found only in large presses. They actually out-perform and out-produce presses costing four times as much. Kenco is "the only small press without the headaches."

And the Kenco 4-in-1 easily converts into a standard die space press, long die space, half and horn press... Four presses in one.

Let us prove you'll punch out big profits with Kencos... There are over 250 Kenco dealers to serve you. Write for details and name of nearest supplier.

Folder on Request

KENCO MANUFACTURING CO.
5211 Anaheim-Telegraph Rd., Los Angeles 22, Calif.

F. W. Borchers has been appointed general sales manager of The Bristol Co., Waterbury, Conn., manufacturers of automatic controlling, recording, telemetering, and aircraft instruments and socket screw products, and D. C. Sanford to manager of the application engineering department.


J. H. Matthews has been appointed executive vice-president of Raybestos-Manhattan, Inc., Passaic, N.J.

Elmes Engineering Division of Ameri-

can Steel Foundries, manufacturers of Elmes Hydraulic Presses and Equipment, announces the appointment of John E. Bush as district representative of the Chicago territory.

Stephen M. Jenks has been appointed to the newly-created post of assistant executive vice-president — operations, United States Steel Corp. John H. Elliott has been appointed vice-president, operations—steel, succeeding Jenks; and Edwin H. Gott has been made general manager, operations—steel, succeeding Elliott.

In **50 SECONDS** per unit... **500** per day
DY-NAMIC BALANCING
ENDS VIBRATION PROBLEMS!
 —actual experience reported by washing machine
 manufacturer using model 375-BHD-R "Bear" machine.



Whether your problem is to cut down vibration, eliminate noise, reduce bearing wear or prevent mechanical failure, "Bear" Dy-Namic Balancing of rotating parts will improve performance of your product. Leading manufacturers, maintenance shops and others are using the "Bear" method with top-production results. No complicated manipulations to learn... average shop man can learn to balance within a few hours.



If your product contains rotating parts send for the **FREE DY-NAMIC BALANCING MANUAL**. Tells how you can quickly, easily, economically balance rotors, armatures, crankshafts and any other part that turns, weighing from 4 oz. to 8 tons! Your copy sent without obligation, Bear Mfg. Co., Dept M20 Rock Island, Ill.

415



"BEAR"
 STATIC AND DY-NAMIC BALANCING MACHINES
 balance rotating parts weighing from 4 oz. to 8 tons

Richard E. LeBlond, president of The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, has announced the appointment of A. H. "Dolph" Davis as works manager. Mr. Davis was previously assistant works manager and has been with the company 18 years. He is a graduate of the University of Cincinnati College of Engineering, Class of 1913.

David J. Ryffel, formerly of the G. M. Bassford advertising agency in New York, has been named advertising manager of the Producto Machine Co., Bridgeport, Conn.

Chester D. Ware, who joined The Trane Co., La Crosse, Wis., in 1952, will become a heat transfer specialist in the development of new Trane products; Henryk Hurwicz has been appointed to work on a special heat transfer development project.

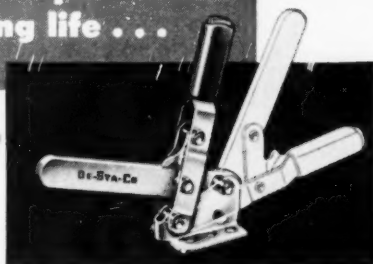
Eugene J. Lenar, formerly with Western Michigan Steel Foundry, Muskegon, Mich., has joined the Carboly Department of General Electric Company as an engineer in the metallurgical process and quality control unit for permanent magnet materials at the Edmore, Mich., plant.

NOW increased production
and long life . . .

with
"HARD-BUSHED"



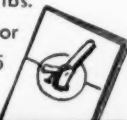
TOGGLE CLAMPS



This is new—Destaco's new clamp design which gives you *hardened* bushings in all series 210, 220, 228 and 240 toggle clamps. The new bushings run full length through the clamp bars from a *larger* bearing surface—and they're deeply serrated to lock in position with no chance of turning in the bars. You get a minimum of wear, smooth, accurate snap action, even under tough production conditions. A feature of our heavier series for some years, this development sets new standards for tooling requiring 500 to 800 lbs. pressures. Further improvements have been incorporated in the "wrap around" construction which strengthens the base.

For any fast clamping action in milling, drilling, welding, bonding, molding, riveting or bolted assembly operations—specify Destaco Toggle Clamps for pressures up to 4000 lbs.

Consult our stocking representatives in your area, or select from our 36-page catalog describing over 45 models. Write for his name and your copy today.



DETROIT STAMPING COMPANY

347 Midland Ave. • Detroit 3, Mich.

William E. Johnson has been appointed district representative for the Cleveland area, the Gisholt Machine Company announced today. Johnson has held various positions in manufacturing, domestic and foreign sales, since joining Gisholt in 1948. He will assume his new duties as assistant to William E. Clark, whose offices are located at 14812 Detroit Ave., Cleveland.

Appointment of Clem W. Kohlman as advertising manager of the Industrial Chemicals Division of American Cyanamid Company was announced recently.

Alexander T. Dagnault has joined Westinghouse Air Brake Co., in the newly created office of vice-president in charge of finance.

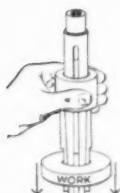
Robert M. Barnum has recently been appointed sales engineer for the Butterfield Division, Union Twist Drill Co., Derby Line, Vt., manufacturers of taps, dies, reamers, drills, counterbores and special metal cutting tools. Formerly associated with the Bond Supply Co., Mr. Barnum will now represent Butterfield in the southern Michigan territory with headquarters in Detroit.

COUNT-CENTRIC

EXPANDING MANDRELS



Tap, it's on



Tap, it's off!

**ONLY 11 TOOLS
PROVIDE EVERY
SIZE ARBOR
from 3/8" to 7"**

Requires no Arbor Press —

Hardened and Precision Ground
for Permanent Accuracy.

Perfect concentricity
within .0005".

Permits heavy cuts without
chattering or distortion.

LeCOUNT TOOL WORKS INC.

"SINCE 1847"

CONTINUING W. G. LeCOUNT TOOL WORKS

390-B CAPITOL AVE., HARTFORD, CONN.

The appointment of **Fred Kaiser** as manager of the Eastern region of Minneapolis-Honeywell Regulator Company, with headquarters in New York, was announced recently. The Eastern region covers New York, New Jersey, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont and Maine.

Floyd J. Compson has been appointed Buick's director of purchases. Compson, who came to Buick in 1932 as assistant purchasing agent, started in the automobile business in 1913 at Lansing.

At a recent meeting of the board of directors, **L. H. Geddes** was named executive vice-president of Greenlee Bros. & Co. and of its subsidiary, Greenlee Tool Co., Rockford, Ill. **D. E. Hawkinson** was elected vice-president in charge of machine-tool sales and **R. J. Samuelson** was elected vice-president in charge of tool sales. **R. O. Knudson** was appointed assistant sales manager of special metal-working machinery and **C. P. Block** as assistant sales manager of automatic screw machines.



James E. Gathings



Jon Chiesl

James E. Gathings and **Jon Chiesl** have been appointed power transmission and conveying chain sales engineers for the Dallas and Chicago district offices of Whitney Chain Co., Hartford, Conn.



John W. Breitmayer



Raymond N. Gruber

Raymond N. Gruber has been made director of marketing research at Standard Pressed Steel Co., Jenkinstown, Pa. He is succeeded as sales manager of the Unbrako line of socket screw products, dowel pins and pressure plugs by **Charles J. Betz**. **John W. Breitmayer** moves up to Betz's former job of assistant sales manager of the Unbrako line.

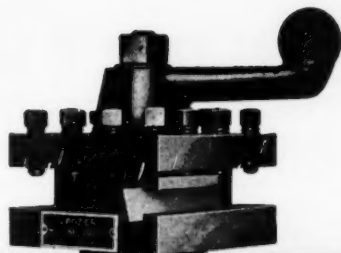
Harrington-Wilson-Brown Co., Mt. Vernon, N.Y., machine tool distributors, announce the appointment of **Fred A. Milnes** as their press specialist.



Fred A. Milnes



Charles J. Betz



America's first and finest
CROZIER TOOL POST TURRET

12 position indexing now makes possible the alignment with work at any thirty degree increment — built-in cut-off tool and holder and positive rapid indexing. They are available in 3 sizes. Save as much as 75% set-up and down time.

Write for catalog.

CROZIER MACHINE TOOL CO.
Hawthorne, California

do you have a

TOOL PROBLEM

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

COLUMBUS DIE-TOOL
and Machine Co.

P. O. BOX 750 • COLUMBUS, OHIO

NORTHERN

PROVEN POWER—HEAVY DUTY HYDRAULIC PRESSES AT VERY LOW COST

Tough jobs throughout industry are using these presses on production lines in a very wide capacity. As well as, various short run jobs.

Shown is the Model GD which can be had in 10 or 20 ton capacity with strokes up to 24". Models AD or Arch-type frames can be had in 10-20 or 35 tons, also with strokes up to 24".

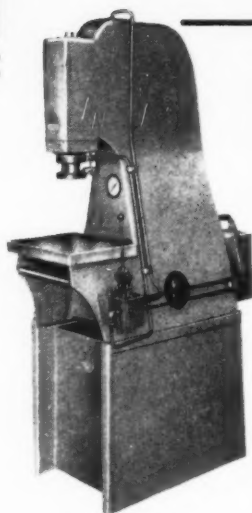
These presses are all double acting with power both ways.

Presses shipped ready to operate, just make electrical connection.

Write for literature

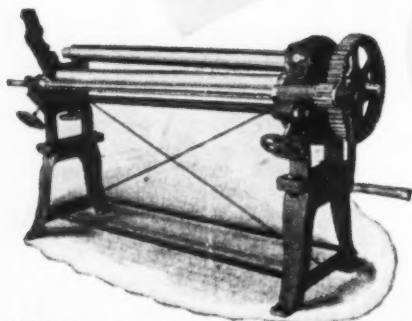
NORTHERN TOOL and MACHINE CO.

1549 North 31st Avenue, Melrose Park, Illinois



Beloit

SLIP ROLL HAND FORMING MACHINE



ABOVE:
No. 14 single back geared
sliproll, floor model with
capacity of 14 ga. 31
other models to meet every
need.

Also manufacturers of
Punches, Shears, Rod
Cutters, Bending and
Straightening Rolls.

Operates to full rated capacity by hand or by power! Compact and heavy duty for years and years of hard usage. The two feed rolls, geared together, assure positive feed on even the thinnest material. The third roll is idle but can be made for gear drive at nominal cost. Completed work is easily and quickly removed. Made in bench and floor models, single and double back.

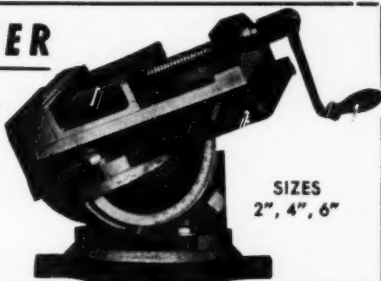
Write for complete details.

**HENDLEY &
WHITTEMORE CO.**
100 Blackhawk Blvd. Beloit, Wis.

MAKE SET-UPS FASTER

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. 3 swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional. Write for circular.

DONOVAN MFG. CO.
80 BATTERYMARCH ST. BOSTON, MASS.



SIZES
2", 4", 6"

W. D. Sullivan, assistant works manager of the Tubular Products Division of The Babcock & Wilcox Co. at Beaver Falls, Pa., has been transferred to the company's boiler division, to be regional manager of the boiler division, manufacturing department, under **M. Nielsen**, vice-president.

Austin Goodyear, general manager of the rubber and conveyors divisions of Hewitt-Robins, Inc., has been elected a vice-president of the company. He joined Hewitt-Robins in 1941.

Joseph Lupo has joined Lupoline Automatic Polishing Equip. Corp., Tuckahoe, N.Y., as president and will head production and have full charge of laboratory and research work.

Glenn C. Wilhide, recently retired from the United States Army, has been appointed Wayne division manager of Gar Wood Industries, Inc., Wayne, Mich.

Harry C. Fleming, Jr., formerly of 1485 McFarland Road, Pittsburgh, has been appointed Youngstown area representa-

tive for Jones & Laughlin Steel Corporation's warehouse division.

Charles E. Schmitt, former machine and tool buyer of the Cleveland Cadillac Tank plant, has been named Ohio sales engineer for the Ace-Central States Machine Tool Company of Detroit.

Charles W. Kapplinger, formerly a metallurgical and research engineer with American Ski Co., Clare, Mich., has joined the Carboloy Department of General Electric Company as an engineer in the metallurgical process and quality control unit for permanent magnet materials at Edmore, Mich., plant.

Manufacturers' Industrial Supply Corporation, 5459 W. Division St., Chicago, Ill., announces the appointment of **Robert W. Lyng** as vice-president in charge of sales.

Theodore H. Booth, recently appointed general manager of the Bonded Products and Grain Division of The Carborundum Company, was elected vice-president recently by the board of directors.

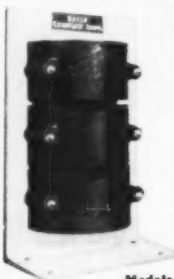
REDUCE DRILL BREAKAGE

... with full length bearing precision bushings, O.D. ground true to I.D. • We specialize in hole sizes #80 to $\frac{1}{2}$ ", in any body size. Other sizes to your specifications. Production small hole drilling, our specialty.

Write for catalog and quotations.

MICRO DRILL GUIDE
AND ENGINEERING COMPANY - Detroit 35, Mich.
P.O. Box 5184, Southfield Sta.

the BASCO SEPARATOR automatically "fans out" *Steel Sheets* for easier, faster, safer handling!



Models for any
thickness to $\frac{1}{8}$ "



manufacturing co.

13 Woodside Street Stamford, Conn.

BASCO lifts the top sheet instantly—automatically raising and separating the next sheet for easy grasping.

- Separates oily sheets • Lifts polished or painted parts without scratching • Eliminates feeding double sheets • Saves gloves—cuts • Handles round, nested or odd shapes • Permanence of magnetism guaranteed.



**TEST A BASCO IN YOUR PLANT —
SOLD ON APPROVAL**

*Request prices and demonstrations.
Distributors Inquiries invited.*

Donald H. Montgomery 1896-1953



D. H. Montgomery

Rutland, Vt., at an early age. He was well known in the machine tool field and held many patents on machinery mechanisms.

Littleton C. Barkley dies

Littleton C. Barkley, 51, general sales manager, West Coast div. of Raybestos-Manhattan, Inc., died Thursday, August 27, at San Mateo, Calif.

Mr. Barkley joined The Manhattan Rubber Mfg. Company, Passiac, New Jersey, now the Manhattan Rubber Divi-

sion of Raybestos-Manhattan, Inc., in 1926.

Ellwood C. Howell dies

Ellwood C. Howell, advertising and sales promotion manager for the Carboloy Department of General Electric Co. during the past 24 years, died of a heart attack Aug. 13.

Mr. Howell was associated with New York advertising agencies prior to 1928 when he joined P. R. Mallory Co., Inc., as advertising manager. Two years later he was appointed advertising manager of Carboloy.

A. Albert Klein passes

A. Albert Klein, assistant director of research and development at Norton Company, Worcester, Mass., and one of the country's leading authorities on abrasives, died suddenly at his home August 25. He was 64 years old.

Harold J. MacDonald dies

Harold J. MacDonald, of Scarsdale, N.Y., who had been associated with United States Rubber Co. for 33 years, died August 19, 1953 at Tobey Hospital, Wareham, Mass. He was 54 years of age.

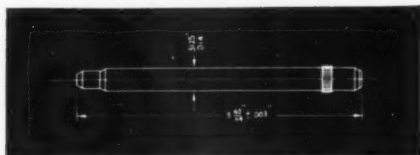
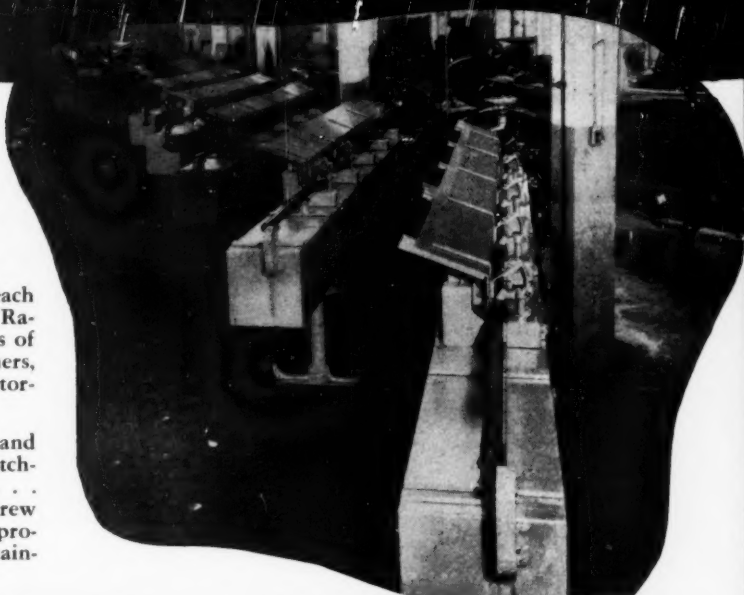
LIPE AUTOMATIC BAR FEEDS

MAGAZINE LOADING

Doubled PRODUCTION!

THE machined worm wheel shaft and agitator rod shown below are typical of the many parts turned out on a bank of seven screw machines equipped with Lipe AML Bar Feeds at Hamilton Beach Division, Scovill Mfg. Co., Racine, Wis., manufacturers of food mixers, vacuum cleaners, hair dryers and other motorized appliances.

No lost time in loading and hand feeding! . . . No scratching of high-finish stock! . . . No idle operation of screw machines! . . . Maximum production capacity fully maintained!



Long worm wheel shaft .3125" dia. machined from piston rod finish, cold-drawn steel. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 2G B&S, production increased 100% over conventional loading operation.

On job after job there is proof—like these examples from a typical four-week production run—that Lipe Automatic Bar Feeds insure big production gains, BECAUSE:

- Stock is fed to screw machines all the time . . . not dependent on operator.
- Feed pressure constantly behind stock.
- Eliminates feed fingers.



Agitator rod .250" dia. machined from S.A.E. #1112 Bessemer wire. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 00G B&S, production increased 100% over conventional loading operation.

- Avoids multiple feed finger feedouts.
- Model AML gives maximum output of machine . . . no "cutting air."
- Saves change-over set-up time.

Get full details on how this machine will increase production and save you money. It's today's big advancement in screw machine stock feeding. Our engineers will gladly study your problem . . . no obligation.



Lipe - ROLLWAY CORPORATION

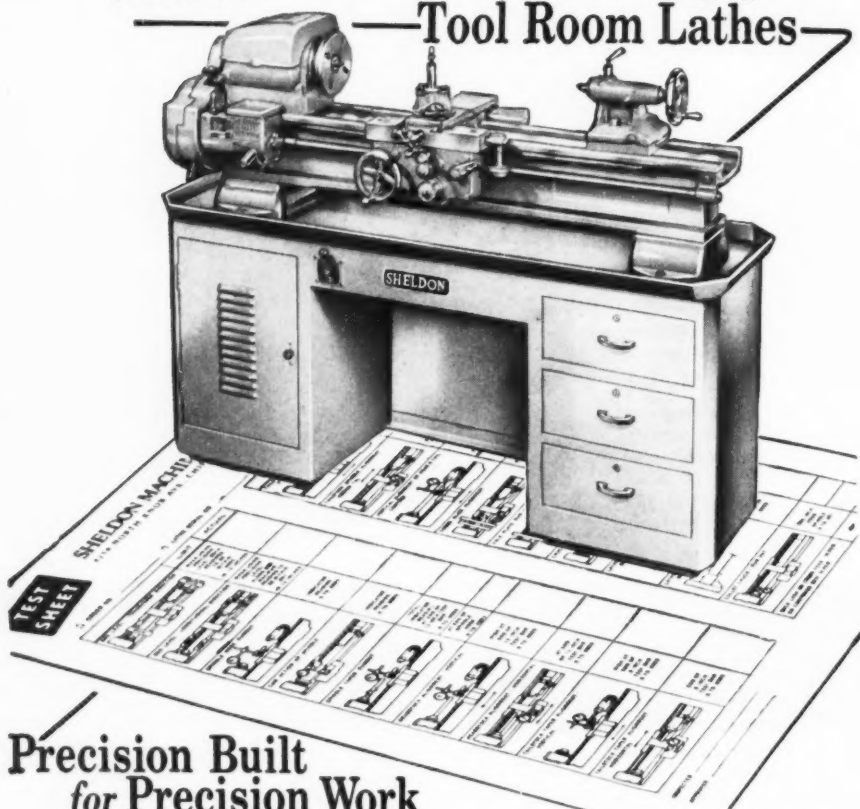
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

SHELDON

CHICAGO

U. S. A.

—Tool Room Lathes—



Precision Built for Precision Work

Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet."

Produced by modern

methods with the finest special machines, these 10", 11" and 12" (swings 13") lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

SHELDON MACHINE CO., INC.

4242 North Knox Ave.,
Chicago 41, Illinois

What's New

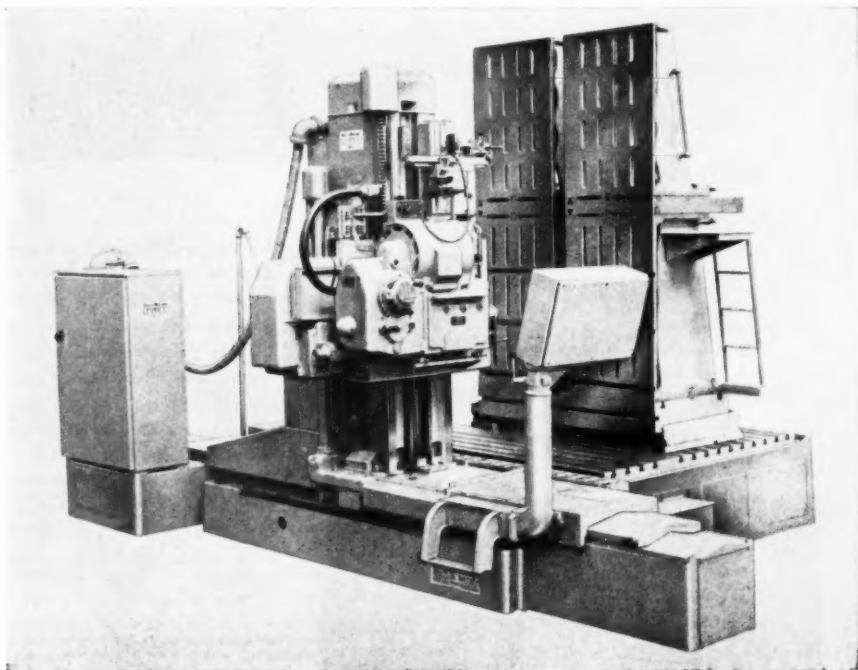
IN

METALWORKING

P & W Introduces Medium Size Keller Machine—Type BG-21

ANOTHER automatic electric tracer controlled milling machine, the Keller type BG-21, patterned after the Keller BG-22

but smaller in size and capacity, has been developed by Pratt & Whitney, Division Niles-Bement-Pond Co., Dept. BB, West

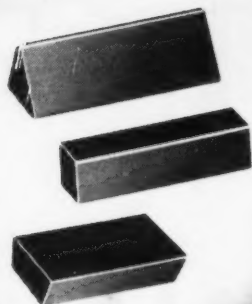


A NEW CARBOLOY[®] CREATED- METAL

A heavy-duty carbide
capable of cutting
more cubic inches of
steel per minute,
with longer tool life,
than existing carbides

... speeding your
heavy-duty steel-cutting
jobs up to 30 percent!

GRADE 370
The first of a new family
— Series 300 —
of steel-cutting carbides



**GRADE
370
CARBOLOY
CEMENTED
CARBIDE**

It's Grade 370 Carboloy Cemented Carbide — the first of an entirely new series specially developed for taking heavy cuts in steel at higher speeds. Unique grain structure lets it cut at around 1800° F without deforming — *higher than ever before practical* with any carbide. Tests and on-the-job applications indicate that Grade 370 can increase performance on many higher speed steel-cutting jobs by up to 30%. Now available in selected standard sizes and shapes.

"Carboloy" is the trademark for the products of Carboloy
Department of General Electric Company

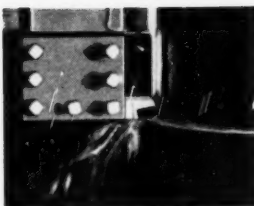
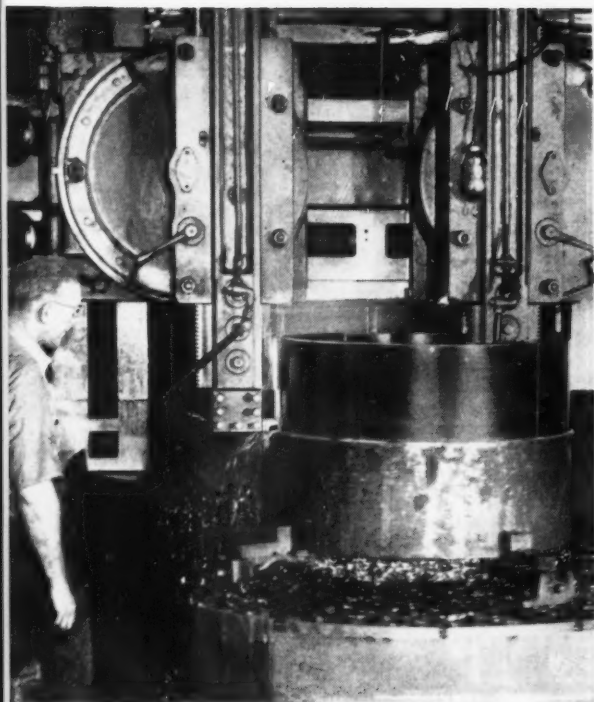


Photo at left and close-up, above, show Grade 370 taking a cut $\frac{1}{2}$ " deep, in large generator retaining ring of cast-alloy steel. The ring is machined at 110 FPM with .048" feed - causing tremendous heat to build up at the cutting edge. Grade 370 holds its shape and cutting edge under these tough conditions. Tool life increased 50%.



Above, Grade 370 machining generator stator frame. On this job a $\frac{1}{2}$ "-deep interrupted cut is made at a speed of 80 FPM with a .024" feed. Grade 370 continues to cut for longer periods under the constant jarring and high temperatures. Tool life increased 50%.

Grade 370 is the first of a new cemented carbide series tailor-made for today's and tomorrow's most severe metal-cutting conditions. The result of a quarter century of research- and development-pioneering in created-metals by the Carboloy Department.

MORE PERFORMANCE FOR YOUR DOLLAR

Its cutting superiority has been proved both in Carboloy laboratories and on tough on-the-job customer applications. On rolls, gun barrels, locomotive wheels and other heavy-duty operations, tools tipped with Grade 370 take heavier cuts at higher speeds and withstand higher temperatures than ever before practical - and this is done with even longer tool life than existing carbides. Tools cut more cubic inches of steel per minute . . . production goes up as much as 30%.

BUILT-IN TIP RIGIDITY

Exhaustive tests by Carboloy engineers showed that on heavy-duty, high-temperature machining applications where heavy pressure is encountered, other tools failed because the cutting edges deformed. Grade 370 is made from start to finish with a new, carefully controlled manufacturing process which gives it a built-in structural rigidity to resist this deformation - even at temperatures of around 1800° F.

AVAILABLE NOW

Grade 370 is available immediately in a number of sizes and shapes. Write today for additional information and for free technical literature. Carboloy Engineering Appraisal Service will work with you on specific applications.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11129 E. 8 Mile Road, Detroit 32, Michigan

Gentlemen: Rush me, at no cost or obligation, all facts now available on your new Grade 370 Carboloy Cemented Carbide.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY _____

ZONE _____

STATE _____

Hartford 1, Conn. Unlike machines using tracer attachments, the BG-21 has been specifically designed for electric tracer control. However, it can also be used as a regular milling machine.

"Kelling" with the BG-21 can be done in two ways: (1) following a sheet metal template or side walls of a model with a profiling tracer and cutting the duplicate shape with the side of an end mill; (2) using a 3 dimensional tracer to follow a full model in a series of parallel passes with the spacing preset by the operator, thus duplicating the 3 dimensional shape. Machines are said to permit quick conversion from one type of control to the other. The BG-21 duplicates the model exactly.

Construction of the BG-21 is horizontal, thus providing maximum support for the spindle head. Because workholding table is stationary and spindle head carries cutter along work, the movable weight is always constant. This horizontal construction allows chips to fall away by gravity plus a flood of coolant, gives the operator a better view of both the model and work being cut, and allows the workpiece to be of unlimited size. Both spindle and tracer are adjustable, consequently it is not necessary to locate the work and

model in exact relation to each other.

Lubrication is simplified by using a central oiling system. A single pump conveniently located at the operator's station is said to provide quick, positive lubrication to all important surfaces on the machine, giving pressure up to 1000 psi. All sliding surfaces have phenolic to metal contacts. Lead screws run through molded phenolic nuts. Bedways are protected with roller mounted telescoping guards and wipers. Ample lubrication and lack of metal to metal sliding surfaces provide the BG-21 with virtually non-scoring ways.

A speed control automatically regulates relative component travel speeds over irregular shapes to produce a constant surface cutting speed, the operator simply setting the maximum desired travel speed, it is claimed. All Keller machines are equipped with a power-limiting relay that protects against tool breakage from overloads produced by variable stock removal. The operator sets up the maximum travel speeds and travel motion of the cutter is automatically slowed to a safe speed during heavy loading and resumes as it clears itself.

Keller BG-21 can be obtained in five



NEW! NEW! NEW!

NO. 150 **HEAVY DUTY DUPLEX MAGNETIC BASE HOLDER**

FOR MOUNTING TEST INDICATORS UP TO 3" IN DIAMETER

Mounts to rods as small as $\frac{3}{8}$ " in diameter, with magnetic pull—125 lbs. Think of that!

Indicator post now firmly brazed to pole piece to insure solidity —an ENCO exclusive.

3-step universal rod in $\frac{7}{16}$ ", $\frac{1}{4}$ " & $\frac{5}{16}$ " diameters, for all indicators.

- ✓ Offset clamp for lugback indicators.
- ✓ New fool-proof adaptor.
- ✓ Jack-type release & positioning screw.
- ✓ Ball swivel and stem of brass & non-magnetic material.

Case, non-breakable Tenite plastic, $1\frac{1}{4}$ " x 4 " x $1\frac{1}{2}$ " high.






Shows Model No. 150 being used to indicate workpiece on engine lathe.

Price \$15.50

Complete

SEND NOW FOR BULLETIN NO. 605 COVERING OTHER TINY-TITAN TOOLS

ENCO MANUFACTURING COMPANY, Dept. 2113
4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Order from your mill supply dealer or send order with name of your mill supply dealer

The vi-KING

HEAVY DUTY INSERTED CARBIDE TURNING TOOL

cuts a KING-size chip!



A King Size cigarette is small by comparison when placed alongside of a vi-KING tool and chip.

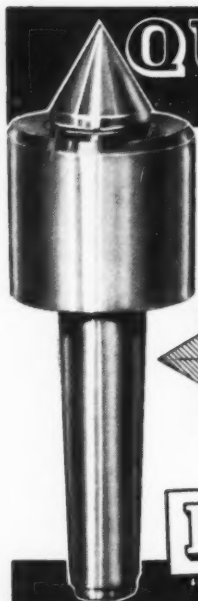
Typical case history proves the **vi-KING** can really take it!

Piece	STEEL MILL ROLL
Material	.90 CARBON ANNEALED, ELECTRIC TOOL STEEL FORGING
Speeds	UP TO 210'/min.
Cuts	UP TO 3/4" DEPTH
Feeds	.050"/rev.
Tool Life	AVERAGE 2 HRS./GRIND DRY CUTTING
Max. HP Available	50

(Name on request)

This vi-KING Tool also incorporates VIKING'S perfected method of MECHANICAL CHIP CONTROL!

VIKING
TOOL COMPANY, INC.
SHELTON, CONN.
INSERTED BLADE SINGLE POINT TOOLS AND MILLING CUTTERS

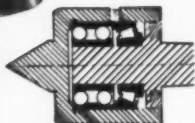


QUADRO LIVE-CENTERS ARE BUILT TO TAKE IT!

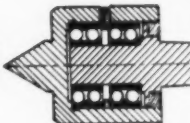
• ACCURATE • CONVENIENT • DURABLE

First choice of factory supervisors is QUADRO — the PRECISION LIVE CENTER designed to support the HEAVIEST load at HIGHEST speed for the LONGEST time!

Each QUADRO CENTER eliminates friction. Two double row precision pre-loaded ball bearings absorb combined radial end thrust. On a lathe, miller or any machine tool, it will give you closer tolerance, dependable performance. That's a guarantee!



TIMKEN BEARING
LIVE CENTER



BALL BEARING
LIVE CENTER

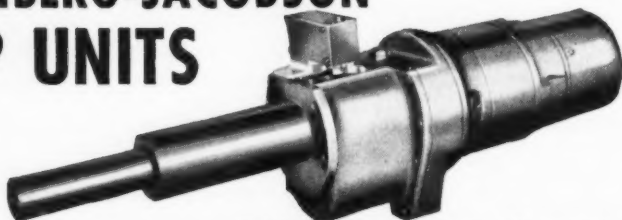
TODAY—ask your supply dealer for FAST FACTS or write to:

DAKON

TOOL & MACHINE CO., INC.
496 Broadway, Brooklyn 11, N. Y.

"TWO DECADES OF IMPORTANT TOOL PARTS PRODUCTION"

REHNBERG-JACOBSON TAP UNITS



Self-contained Tap Units are fully-automatic with feed positively controlled by an accurate lead screw. Capacities in four sizes range from 5/16-18 and 1-1/4" stroke to 1-1/2-6 and 4" stroke.

These units are all available for quick delivery. You can mount them on structures of your own to make practical and efficient production machine tools.

Write for Literature

REHNBERG-JACOBSON MFG. COMPANY

DESIGNERS & BUILDERS OF
SPECIAL MACHINERY



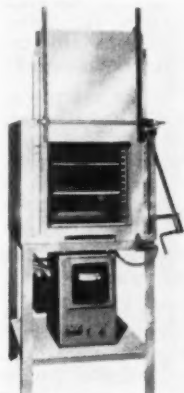
2135 KISHWAUKEE ST.
ROCKFORD, ILLINOIS

different sizes, ranging from 4' x 2½' up to 10' x 4' plus special two-spindle models. Rapid traverse up to 250 inches per minute and automatic chip conveyors are standard on the larger models.

Automatic recirculating air draw furnace

The automatic recirculating air draw furnace, made by Blue M Electric Co., Dept. BB, 306-308 W. 69th St., Chicago 21, Ill., is said to feature the following:

1. A door which automatically self-locks itself at any position between closed and full open—prevents accidents to operator—impossible for door to ever drop. This easy-lift, vertical-rise, auto-



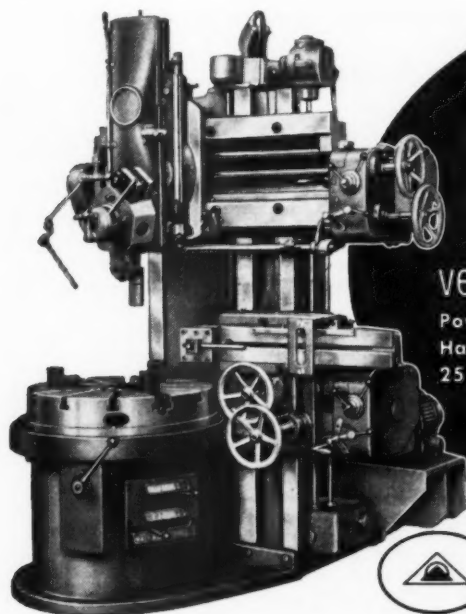
matic self-locking door has a worm-gear-rack combination which prevents door binds at all temperatures.

2. Also, prevents burns to operators, when inserting or removing materials from furnace, through means of automatic air shutoff. Air circulation stops when door is opened.

3. Guided air flow circulation to give better uniform heat treatment of specimen. Rear wall mounted air impeller circulates air in sufficient volume and velocity along both sides of furnace, between Modella heater banks and radiant heat shields, toward door seal face.

4. Power selector switch automatically regulates power input in proportion to operating temperatures.

5. Test specimens not subjected to radiant heat because shelf support sides provide both directed air-flow spaces and radiant heat shields.



36" WEWAG

vertical turret lathe

Power rapid traverse to both heads.
Hardened, ground gears
25 hp. V-belt drive

immediate delivery

Write or phone
for full details.



Parker Machine Company, Inc.
158 Pioneer St., Brooklyn 31, N.Y.
TRiangle 5-2103 and 2157

Lathe "converter"

Marvic, Inc., Dept. BB, 250 Peninsular Ave., San Mateo, Calif., announces a development that is claimed to put engine lathe operation on a productivity basis comparable with turret lathe operation.

Marvic consists of a 4-faced block and five basic tool holders. The tool block is mounted quickly and easily on any engine lathe. It is said to be



rock solid, permitting deep cuts, without chatter and without tool breakage, and permitting full power operation of the lathe.

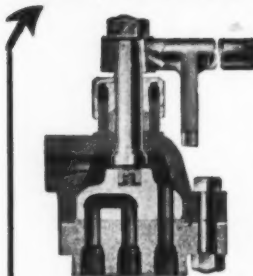
Each of the four machine-finished faces has dovetail channels. The tool holders fit these channels and are locked in any one of the four faces, without changing the block position.

In the course of a job, the tool and holder may be removed instantly; another holder and tool substituted for the next operation, then the original holder and tool replaced and instantly locked in position for a repeat.

Improved solenoid-operated air valve

The basic design embodies an aluminum alloy, surface hardened spool, on which the sealing material is integrally molded and bonded. These seals enter the precision finished, bearingized and highly polished bores of body and retainers to effect instantaneously positive "sealed with air pressure" seal,

This Large Processor Chooses Nicholson Valves for LONG WEAR



A large rubber firm reports that Nicholson cylinder control valves recently completed 10 years of constant use, without servicing, on an operation which had proved too much for other tested units. This report further confirms that Nicholson valves, with their specially treated hard seats and non-corrosive lapping flat discs, become tighter with use. For air, gas, oil, steam, water in lever, foot, solenoid and motor types. Press., 300 to 5,000 lbs.

CAT'G.
552

117 Oregon St., Wilkes-Barre, Pa.

W. H.

NICHOLSON & CO.

TRAPS · VALVES · FLOATS

This man is running **SIX** *drill presses*

He is performing six consecutive drilling operations with a single jig at a single working station, with less handling time, and without changing tools. He is using the Lign-o-matic turret on a standard drill press.



PUT THE LIGN-O-MATIC TURRET IN YOUR SHOP FOR A FREE 10-DAY TRIAL . . . IT WILL . . .

INCREASE PRODUCTION — Many users report more than 300% greater output in actual production. Turret indexes faster than tools can be changed or work moved to another spindle.

CUT COSTS — patented self-centering principle guarantees accuracy equal to drill press spindle. Lign-o-matic

reduces tool and jig wear, cuts worker fatigue; adds up to faster work with fewer rejects. All parts completely guaranteed for **TWO YEARS** against defective manufacture.

PRICE — Model D, 6 spindles with No. 2 Jacobs male taper \$235.00

DELIVERY — Currently, 2 weeks.

TRY IT YOURSELF at our expense. If you are not fully satisfied for *any* reason, return turret within 10 days and pay nothing.



HOWE & FANT, INC. 539 FLAXHILL ROAD SO. NORWALK, CONN.

- ☐ Please rush Lign-o-matic turrets for (drill press make) (size) (quill dia.)
(spindle taper)
- ☐ Please send bulletin with complete information.

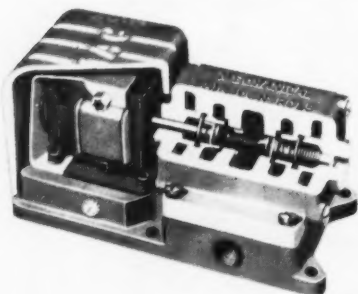
MY NAME

TITLE

(Attach coupon to company letterhead)

according to the manufacturers, Mechanical Air Controls, Inc., Dept. BB, 15311 W. 11 Mile Rd., Detroit 37, Mich.

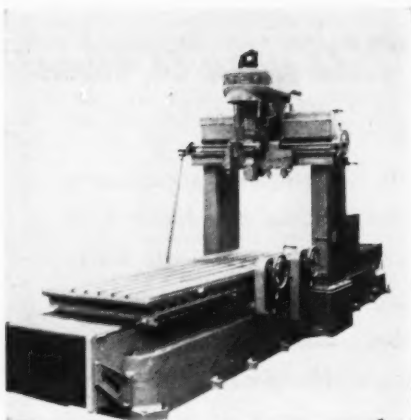
All electrical and mechanical con-



struction is simple and accessible. Each valve has full pipe orifice area with maximum of straight-through flow.

Profiler for large castings

Morey Machinery Co., Inc., Dept. BB, 410 Broome St., New York 13, N. Y.,



has brought out an additional model of the 40M profiler. This machine is especially suitable for the milling and profiling of large forgings and castings, such as aluminum and magnesium airframes, as well as cast iron parts and steel forgings, it is claimed.

An important feature of this new

HOT MELT PLASTIC COATINGS

for GEARS

• TOOLS •

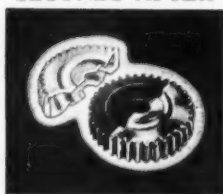
PRECISION
PARTS

BEFORE



Dip

SECONDS AFTER



Coated • Protected

DIP-PAK

Protect vital, expensive tools, gears, and machined parts during storage and shipping with Fidelity's durable, transparent plastic coatings. Merely melt coating briquette, dip parts, cool. Lasts indefinitely. Tough; abrasive, moisture, rust resistant. To remove, slit, peel. Re-melt, re-use coating. Economical, practical, rapid. Protect parts; save money.

Write for Bulletins and Free Samples

FIDELITY CHEMICAL PRODS. CORP.

473 Frelinghuysen Avenue, Newark 5, N. J.

ALCO

The Alco Tool Co., after years of engineering research, now introduces these new and improved releasing type tap and die holders for use on Turret Lathes and Hand Screw Machines.

Shown here are the

ALCO RELEASING TAP HOLDER which needs no bushings and holds taps really tight. Perfect threads with no tap breakage and with even wear on all leads of the tap.

ALCO RELEASING BUTTON DIE HOLDER... Concentric alignment of dies with work insures perfect threads and makes dies last longer.

ALCO RELEASING ACORN DIE HOLDER... The only acorn type releasing model with adjustable concentric alignment.

In all three models, the new ball clutch operates automatically as soon as the spindle is reversed for unthreading.

Write today for the complete story on these new Alco Tools.



SEND FOR NEW CATALOG

ALCO TOOLS

THE ALCO TOOL CO.
52 BIRDSEYE STREET, BRIDGEPORT, CONN.

Save Time . . . Labor . . . Materials with **BEVERLY** metal cutting **SHEARS**



Inside SLOTTER

Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

Throatless SHEAR

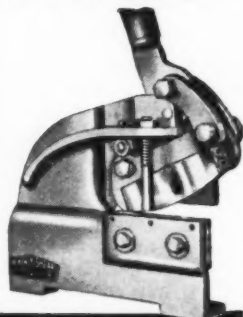
Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Slitting SHEAR

New "55" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.

See your Beverly Distributor.

Write for FREE illustrated Bulletin.



Beverly **SHEAR MFG. CO.**

3005 W. 111th STREET • CHICAGO 43, ILLINOIS

How **SQUARE HOLED SLEEVES** **SPEED UP TOOL-MAKING!**

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

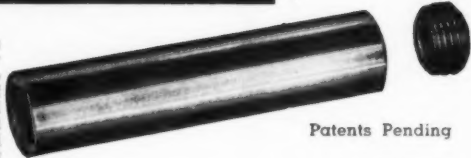
SLEEVES MADE IN FOLLOWING SIZES:

3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

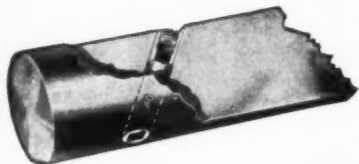
STURDY BROACHING SERVICE

23516 TELEGRAPH ROAD

DETROIT 19, MICH.



Patents Pending



*Write for
Literature*

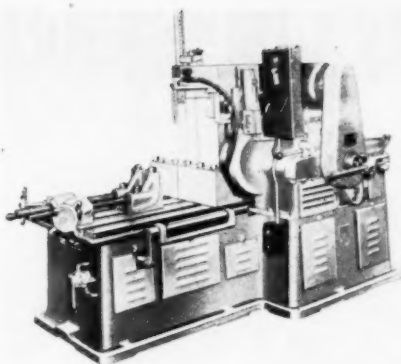
model is the 10' table with full support bed. The machine combines rigidity of construction with the ability to take full advantage of tungsten carbide tools.

Peerless introduces changes in hack saw machine

Peerless Machine Co., Dept. BB, 1600 Junction Ave., Racine, Wis., has announced changes in its vertical extra heavy-duty hydraulic hack saw machine.

Improvements include a larger hydraulic pump, improved feed piston and piston ring design, a greatly improved timing of the cam action to effect precision timing and bringing the saw blade in and out of the work.

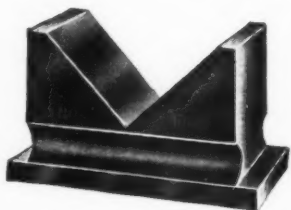
The feed pressure is applied through an improved hydraulic system with the saw blade operating vertically having an improved larger lift on the relief or non-cutting stroke. With a steady flow of coolant applied from the top, all the chips are quickly washed into the chip tray permitting the saw blade to cut faster, cleaner, and more accurately.



The machine now has all the slide bearings lined with hardened and ground removable type inserts, and replaceable heat treated shoes; all revolving heavy-load bearings are ball or roller bearing antifriction; and an air cylinder counterbalances or offsets the weight of the saw frame in its reciprocating motion.

SEMI-PRECISION "V" BLOCKS

for all-around shop use



Sturdily designed for hard usage . . . Accurately machined from close-grain iron . . . Ideal for drill presses, milling machines, shapers and planers. Will test round shafting for straightness . . . Economically priced.

Write for descriptive bulletin.

STOCK NO.	BASE	HEIGHT	THICK- NESS	ACROSS TOP	CAP.	WT.	NET PRICE
10	4½" x 3"	2¾"	3"	3½"	3½" dia.	6½ lbs.	\$ 7.50
11	6½" x 4"	4"	4"	5½"	6" dia.	18 lbs.	\$15.00

ACME TOOL COMPANY

71 WEST BROADWAY

NEW YORK 7, N. Y.

NIELSEN Heavy Duty

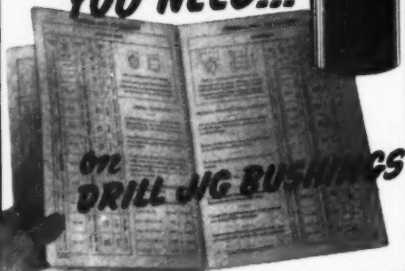
Live Centers

Write for
catalog on
live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON, MICH.

**ALL THE DATA
YOU NEED...**



**on
DRILL JIG BUSHINGS**

...at the flip of a single page

Make drill jig designing easier
with this "Flip-a-page" catalog.
Free on Request

COLONIAL BUSHINGS INC.
31780 GROESBECK HIGHWAY
FRASER, MICHIGAN

PALMGREN

ROTARY, INDEX, MILLING TABLE
The ONLY TABLE Having ROTARY FEED
Combined With
DUAL CROSS FEEDS

No. 83

Now
Only! **\$54.50**

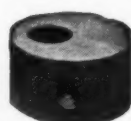


Turns Your
DRILL PRESS
Into A
VERTICAL
MILLER

This PALMGREN TABLE is sensational in price, construction and performance. Just what shops need for accurate, precision work. You can mill straight or curved, slot, drill, also rout, rabbet, mortise and sand on wood. Do hundreds of jobs as milling slots, grooves, keyways, squares, hexagons, curves, flats, dovetails, indexing and laying out work.

Designed for use on Drill Press or Milling Machine. It handles all types of metal and woodworking operations and makes your drill press a vertical milling machine. Precision built. It permits close tolerances. Rotary Feed is calibrated in degrees. Cross Feeds in thousandths. Cross slides and feeds are $2\frac{1}{4}$ " each side of center— $4\frac{1}{4}$ " overall. Has Acme thread cross feed screws, adjustable gibs on cross slides—40 to 1 worm and gear ratio in rotary feed. 4 Bolt slots—2 lock screws.

No. 83 Table Dia. 8", T-Slots $\frac{1}{2}$ ", Base Keyway $\frac{1}{2}$ ", Base Dia. $6\frac{1}{4}$ ", Ht. 5", Wt. 37 lbs. Price \$54.50
Order Today! Write for New Catalog No. 201
CHICAGO TOOL AND ENGINEERING CO.
8384 South Chicago Avenue, Chicago 17, Ill.



waiting for you

Gone are the days when you had to wait for delivery on most punches and dies while they were made to order. **Now they wait for you.**

You can order for **immediate shipment** from our stock 76 styles of punches and 65 styles of dies in round, flat, oval, and square sizes to fit most makes of presses.

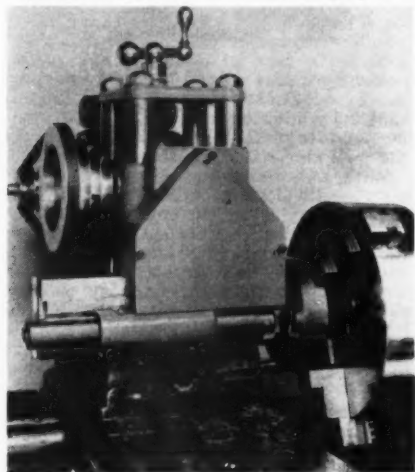
Besides this saving of time, you save money. Send for our catalog sheets and check the lists of immediately available sizes and their prices.

T. H. LEWTHWAITE MACHINE CO.
312 East 47th St. New York 17, N. Y.

Internal keyseater, slotter and shaper

Versa-Mil Co., Dept. B, 33 W. 42nd St., New York 36, N.Y., has announced an internal keyseater, slotter and shaper which is said to cut internal keyways from $\frac{1}{8}$ " to 1" in width, in bores from $\frac{1}{2}$ " diameter to any required size. It can be set on a lathe carriage, so that the keyway may be cut in the same setup in which a hub is bored. It is also used as a portable slotter or shaper, and as a bench shaper.

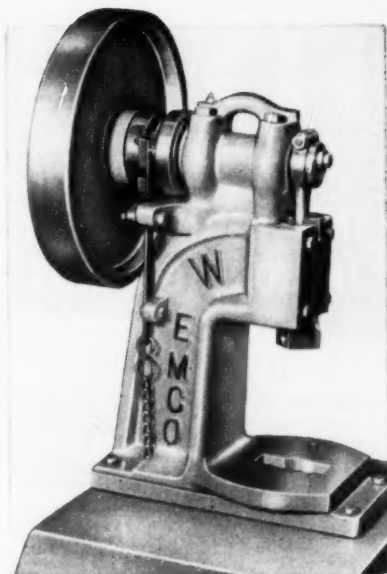
Its operation is normally as a draw shaper, but where accessibility is limited as in a blind keyway, a flip of a switch and a quick change of the tool holder will adapt it for push shaping. Stroke is adjustable from 0" to 5" in length, and



a full 360° in angle. Interchangeable tool heads provide clapper action, which relieves the tool bit on the return stroke.

An oil reservoir provides automatic lubrication for every rotating and sliding surface. The dovetail slide, which guides the stroke, is adjusted for fit by a tapered gib. Rocker arm and all tool holders are hardened steel. The tool bar is carburized, hardened, and ground on outer surface and tapered socket for tool holders. Bronze ram, slide ways, and gib are hand scraped for fit.

The rigidity and close fits combine to produce cuts controlled in width to tolerances within .001". Keyways $4\frac{1}{2}$ " long have been made in SAE No. 1020 steel using a $\frac{1}{2}$ "-wide cutter bit and averaging .007" per stroke. Wider cuts are made either by moving the tool or changing to wider tool bits after making a $\frac{1}{2}$ " cut to required depth.



Emco "W", bench type. Also Emco "X" (larger size). Both sizes also stand-mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES

are **SPEEDY** and **SAFE**

Versatile Emco "W" and "X" presses excel for punching, forming, stenciling and riveting metal, rubber, leather, plastics and other non-metallic materials. You get up to 300 operations per minute. Profit from big machine speed, strength, rigidity, accuracy and endurance. Compact, fool-proof (non-repeating), simple design—easy to understand and operate. Thousands of Emcos in money-making use testify to Klaas' dependability since 1921.

Two Practical Sizes

Emco "W"— $\frac{3}{4}$ ", 1" and $1\frac{1}{4}$ " stroke
Emco "X"— $1\frac{1}{2}$ " and 2" standard stroke
Specials to order

Write on your letterhead for Bulletin "B-11".

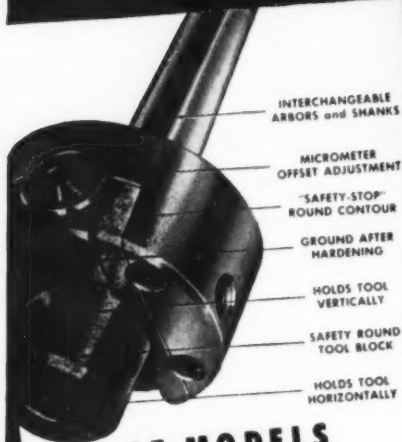
UNUSUAL
AIDS
TO
INDUSTRY

**THE KLAAS MACHINE
& MFG. CO.**
4346 East 49th St.
Cleveland 23, Ohio

KLAAS-BUILT

FLYNN

**FOR 35 YEARS
THE LEADING NAME
IN BORING HEADS**



15 MODELS

Flynn has studied boring head applications for many years—builds a size and design for every job with all the wanted features. Machinists with real appreciation for quality and precision prefer Flynn.

FLYNN

MANUFACTURING CO.

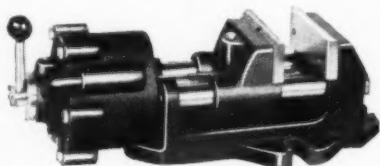
133 Flowerdale
Ferndale 20, Mich.

Write for our catalog

FLYNN

Air vise has controlled power

Sanderson Sales Service, Dept. BB, Hamden 18, Conn., distributor of Smith quick acting vises, announces the addition of a new model designed to increase production through the use of controlled air power. The new air vise features a 5" jaw and a maximum opening of 7½". A sliding jaw is mounted on two large size hardened and ground bars. Cylinder



pressure is transferred through the bars to the stationary jaw. This feature is said to eliminate strain in the base casting and to assure perfect alignment of the cylinder with the sliding jaw.

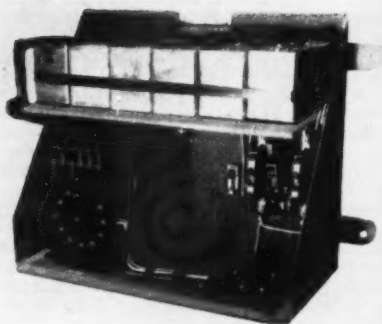
With a pressure ratio of 20 to 1, the air vise develops up to 3000 pounds holding pressure on a 150 pound air line. A hand operating valve is built directly into the cylinder. Speed controls are incorporated in the cylinder so that the work motion of the sliding jaw can be slow or fast to suit the job. Valve control lever can be attached to drill press spindle or milling machine travel to allow automatic opening and closing of the vise with the return motion of the machine.

Add-A-Phase power converter

With the Add-A-Phase, product of System Analyzer Corp., 1327-BB N. Market St., Milwaukee 2, Wis., the problem of developing a converter for operating 3 phase motor from single phase lines has been approached by employing a new engineering principle. It is necessary to change the current and voltages from a 180° displacement, or single phase, to that of a 120°, or 3 phase. The phase angles must remain reasonably close at rated motor loads. Otherwise, excessive currents will be drawn by the motor causing dangerous temperature rises and appreciably shorten the life of a motor.

Add-A-Phase is said to permit the operation of all N.E.M.A. Class B, C, variable speed and 2-speed motors to be operated from a single phase lighting service and will develop 150% starting torque and maintain 110% load without exceeding manufacturers' rating.

Tests by the Union Electric Co., St.



Louis, are said to have determined that at any position where balance has been achieved, a reduction in load will effect an unbalance in the converter but never to the point where it would endanger equipment, because as the load is reduced, the currents falling out of balance go to lower values, which would not cause temperature rise in the motor.

Small conventional air draw furnace

Cooley Electric Mfg. Corp., Dept. MB, 38 S. Shelby St., Indianapolis 7, Ind., is offering its recirculating air draw furnaces, Models ACH and ACH-2, with chamber sizes of 8"x6"x14" and 12"x8"x18" respectively, generally useful in the tempering of steel and other operations requiring precise low temperature control, such as aluminum rivets for airplane assemblies and repairs.

This small furnace follows the design and performance characteristics of large convection type furnaces, it is claimed. A stainless steel retort houses entire in-



GRAND offers



PRECISION GROUND ARBOR SPACERS FROM STOCK

HARDENED AND GROUND WITH KEYWAY

Width Inch	7/8" bore 1.375 O.D.	1" bore 1.125 O.D.	1 1/4" bore 1.375 O.D.	1 1/2" bore 1.625 O.D.	2" bore 2.125 O.D.
1/8	\$.60 ea.	\$.70 ea.	\$.90 ea.	\$1.10 ea.	\$1.50 ea.
3/16	.80	.90	1.00	1.20	1.60
1/4	.70	.80	1.10	1.20	1.70
5/16	.80	.90	1.10	1.30	1.80
3/8	.90	1.00	1.20	1.40	1.95
1/2	1.00	1.20	1.40	1.60	2.25
5/8	1.20	1.40	1.60	2.00	2.80
1	1.50	1.80	2.20	2.80	3.80
1 1/4	1.70	2.05	2.45	3.10	4.75
1 1/2	2.00	2.30	2.70	3.40	4.90
2	2.50	2.70	3.20	3.90	5.20
3	3.50	3.80	4.40	5.20	7.00

PRECISION GROUND RUNNING BUSHINGS

FROM STOCK

HARDENED AND GROUND WITH KEYWAY

No. of Bushing	Die Boring Inches	Die Hole Inches	Length Inches	Price Each
2-1/2	1 1/2	1 1/2	2 1/2	\$7.50
2-1/2	1 1/2	1 1/2	2 1/2	7.50
4-1/2	1 1/2	1 1/2	2 1/2	9.00
6-1/2	1 1/2	1 1/2	2 1/2	9.00
4-1/2	2 1/2	2 1/2	2 1/2	9.00
6-1/2	2 1/2	2 1/2	2 1/2	11.00
8-1/2	2 1/2	2 1/2	2 1/2	11.00



ARBOR SPACER SHIMS

FROM STOCK

FOR FAST AND ACCURATE SPACING OF MILLING CUTTERS, GANG SAWS, SLITTERS, ETC.

Each set contains 19 pcs. from .001" to 125".

Diameter of Hole	Outside Diameter	Price per Set
3/8"	1 1/8"	\$1.50
1"	1 1/2"	1.50
1 1/2"	2 1/2"	1.50
1 1/2"	2 1/2"	2.20



MICROMETER ADJUSTABLE SPACING COLLARS

FROM STOCK



These collars save milling machine set-up time and eliminate the use of paper shims and thin steel washers. Quick and positive adjustments made without removing cutters from milling machine arbor. Teeth accurately ground and graduated and protected from chips. Standard collars have .002" step adjustments. When ordering specify size bore only.

Bore Dia. In.	O.D. In.	Collar Thick. In.	Keyway Depth In.	Keyway Width In.	\$7.50 each
1	1-7/8	7/16	1/32	1/4	
1 1/4	2-1/8	1/2	1/8	5/16	
1 1/2	2-5/8	9/16	5/32	3/8	

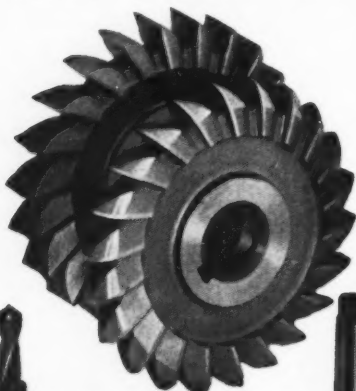
F. O. B. — N. Y. C.

Prices subject to change without notice.

GRAND TOOL & SUPPLY Co.

176 B GRAND ST. • NEW YORK 13, N. Y.

RUTLAND



**SAVE TIME - SAVE MONEY
SAVE TOOLS**
For rapid changeover of Tool
setups

SPECIAL TOOLS FROM STANDARD TOOLS

All types of special reamers, cutters, end mills and drills can be made from standard catalog tools. We can make these specials to your blueprints quickly and economically from our large stock of standard cutting tools.

Mail your specifications or blueprints today for immediate price and delivery.

Rutland TOOL SERVICE

1517 E. McNichols • DETROIT 3, MICH.

Tw in brook 3-6240

terior, and side wall baffles are provided. These direct the air flow and support the interior perforated shelves.

A fan is located below the perforated hearth. It is driven through a V-belt by a motor situated at the rear of the furnace for accessibility. The furnace atmosphere is directed outward to baffled side sections, upward behind these baffles, at which point the elements are located, over the top and into the chamber. It continues downward, being forced through the work, returning to the fan. This convection provides uniform absorption of heat by the charge. Baffle walls prevent direct radiation from the elements to the work surface, thus avoiding overheating and uneven temperatures.

V-belt stretcher and tension regulator

Shippert Mfg. Co., 414-BB S. Galena Ave., Dixon, Ill., announces a tool-set made to operate on three sizes of V-belting—A, B, and C. The V-belt stretcher and tension regulator is made to clamp on the belt at any spot. It is said to be useful when installing the larger sizes of V-belts. When the belt is placed on pulleys with fixed centers, a long piece of belting can be put in place on the pul-



leys; then the belt is pulled to the tightness desired and cut off, leaving just enough space between the belt ends to receive the connector linkage.

Space between belt ends should be as follows: A belt, $\frac{1}{2}$ "; B belt, $\frac{3}{8}$ "; C belt, $\frac{1}{4}$ "; D belt, $1\frac{1}{2}$ "; E belt, $1\frac{3}{8}$ ". Bails on belt ends are next installed; belt is again pulled to desired tension, linkage is inserted, and belt is ready for use. Tool is also used to replace broken belts to just match the tension of other belts on a power drive where a number of belts are operating over one pulley.

Leitz Opti-Comparitol amplifying gage

The importation of a German-made amplifying gage, the Leitz Opti-Comparitol, combining both optical and mechanical principles, has been announced by the George Scherr Co., Inc., Dept. MB, 200 Lafayette St., New York 12, N.Y.

A beam of light from a low voltage

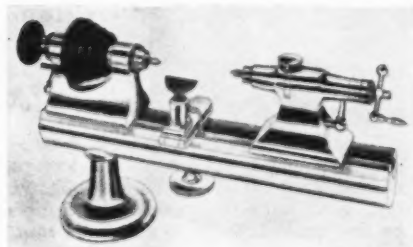


lamp projects an index mark against a tilting mirror with a fulcrum that is said to give a 4:1 initial magnification to the contact tip. The index mark is reflected against a first surface mirror that re-directs the beam of light and the index mark against a long translucent screen which results in a total amplification on the scale of 1000:1.

The instrument is set up with a master, or gage, block and the work pieces are passed under the contact tip showing their variations, if any, on the screen against a brightly illuminated background. Oversize parts are shown as green and undersize as red.

Mite-sized lathes

Said to be the smallest lathes in existence, the watchmakers' lathes distributed by the C. & E. Marshall Co., Dept. BB, Box 7737, Chicago 80, Ill., are useful to laboratory workers as well as to those who manufacture watches. Pictured is the Peerless lathe with screw feed tail-

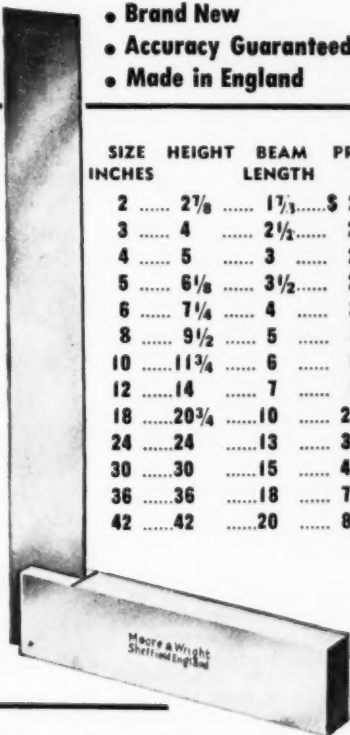


PRECISION GROUND Production Engineers' Square

HARDENED BLADES

- Brand New
- Accuracy Guaranteed
- Made in England

SIZE INCHES	HEIGHT	BEAM LENGTH	PRICE
2	2 7/8	1 1/3	\$ 2.00
3	4	2 1/2	2.25
4	5	3	2.50
5	6 1/8	3 1/2	2.75
6	7 1/4	4	3.00
8	9 1/2	5	4.00
10	11 3/4	6	6.00
12	14	7	8.00
18	20 3/4	10	25.00
24	24	13	30.00
30	30	15	45.00
36	36	18	70.00
42	42	20	80.00



Immediate Delivery From Stock!

Up to 12" size supplied in wooden box. 18" size and over supplied in strong wooden sheaths.

Dealer Inquiries Invited

DE WITT EQUIPMENT CO.

136 Lafayette St., New York 13, N.Y.

Telephone: WALKER 5-4048

stock. Dimensions include: wire chuck capacity through spindle, 0.1968"; distance from bed to center, 2"; swing over bed, 4"; length of bed, 12"; diameter of bed, 1.750"; distance between centers, 4.25"; travel of tailstock spindle, $1\frac{1}{4}$ ".

Square top welding bench

A welding bench with a top $36\frac{1}{2}$ "x $36\frac{1}{2}$ " is announced by Industrial Equipment Bench & Mfg. Co., Inc., Dept. BB, 98 South St., New Britain, Conn. Though not furnished, fire brick 9 "x $4\frac{1}{2}$ " can easily be installed on the top. The bench is standard height, $33\frac{3}{8}$ "; has a shelf with partitions for holding welding rods.

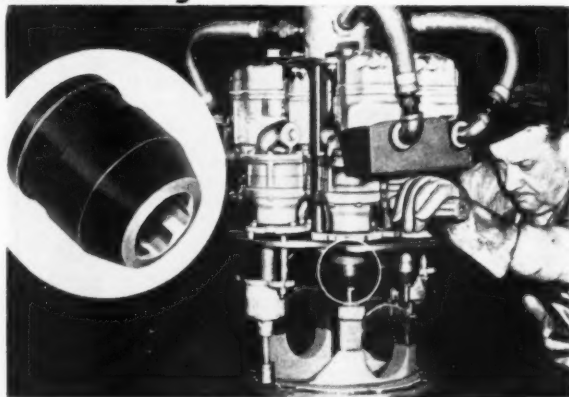
The legs are electrically welded into formed sections. Bench is so constructed to permit it to stand sturdily by itself without end or wall support, it is claimed. Choice of lock or padlock attachment is

available for the electrically welded 18 "x 22 "x 5 " steel drawer.



Surface drive tool socket permits positive contact while turning

The Cornwell Quality Tool Co., Dept. BB, 1028 Cleveland Ave., Mogadore, Ohio, has announced the availability of a new type hexagonal nut socket that permits the nut running tool to positively engage the nut while turning. Designed for use on air or electric powered drive tools, this new socket is particularly suited for multiple nut running in mass production applications, such as automobile wheel assembly.



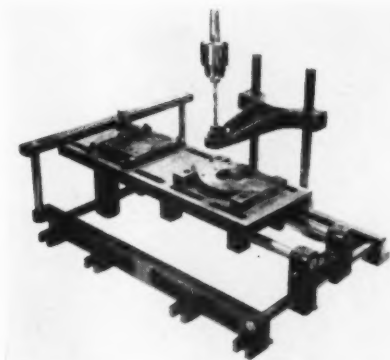
The new surface drive unit can be applied at a slight angle so nuts can be run close to obstructions. In some instances this feature eliminates the necessity of semi-flexible sockets.

Manufactured from alloy steel and specially heat-treated to provide maximum wear resistance and long life, the new socket is available in drive sizes of $\frac{1}{2}$ " and $\frac{3}{8}$ ". The $\frac{1}{2}$ " square drive is furnished in regular and deep lengths to fit $\frac{1}{2}$ " to $1\frac{1}{16}$ " hexagonal nuts. The $\frac{3}{8}$ " square drive size fits hexagonal nuts

of $\frac{1}{16}$ " to $1\frac{1}{4}$ " in the regular length and $\frac{3}{4}$ " to $1\frac{1}{8}$ " in the deep length. All sockets are available in the size ranges in increments of $\frac{1}{16}$ ".

Hole locator device

A new hole locating device, Production Master, has been announced by the Honnef Eng. Co., Dept. B., 20-39 Beaver Rd., Wethersfield, Conn. It is claimed by the manufacturer to eliminate much



jig and fixture designing, making any standard drill press produce accuracy commensurate to jig drilling and reaming, and jig boring. It will handle work up to 6 $\frac{3}{4}$ " by 10" by the height permitted by the drill press.

Slide rule pencil

Device Development Co., 226 W. 4 St., New York 14, N.Y., has announced a vest-pocket slide rule-two color pencil-reading magnifier which includes a depth gage, extendable detaching ruling-edge measure, eraser, lead

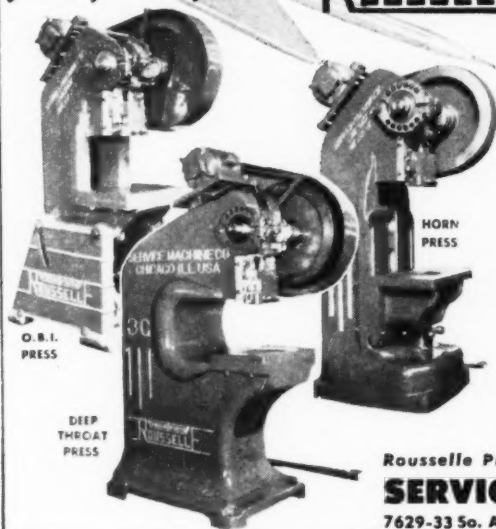


chamber, and an optical cursor-clip. This 10-in-1 Devco quality instrument has permanent debossed A, B, C, D, L, S, T, CM & IN scales. Weighs 1 oz., 6 $\frac{1}{4}$ " long.

Men who had to "lick" the very problems you're facing designed...



ROUSSELLE PRESSES



That's why they're fast, accurate, so adaptable, so easy to operate. Why maintenance is simple. Why initial cost is low . . . Often considerable savings and improved punch press operations are possible if you let our engineering staff assist you. There is no obligation. Simply furnish the details relating to your need or problem and if possible send samples or drawings of the work. You will hear from us promptly.

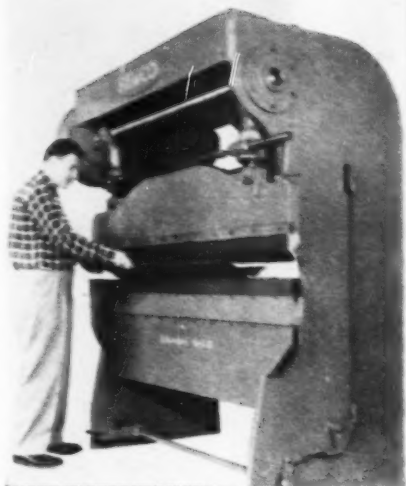
**Sold Exclusively Through
Leading Machinery Dealers**

**Rousselle Presses are Manufactured by
SERVICE MACHINE CO.
7629-33 So. Ashland Ave., Chicago 20, Illinois**

Semco announces new press brake

Service Machine Co., Dept. BB, 204 Miller St., Elizabeth, N.J., manufacturers of Semco brake dies and special machinery for over 34 years, announces manufacture of a new 6" and 8" sheet metal forming power press brake. It is said to assure maximum performance, minimum maintenance and ease of operation for utmost accuracy of parts manufactured. Sturdily constructed for long life, the friction factor of operation has been largely eliminated. It stands 79" high, 44" deep and the width is 66". Ram and bed plates are 72" and 96" long respectively for the two models.

A die area of 12" shut height is provided with a 3" stroke and 4½" adjustment of stroke. The motor is 1½ h.p. and the speed 1800 r.p.m.



For building terminal blocks

IlSCO Copper Tube and Products, Inc., Dept. BB, Mariemont Ave., Cincinnati,

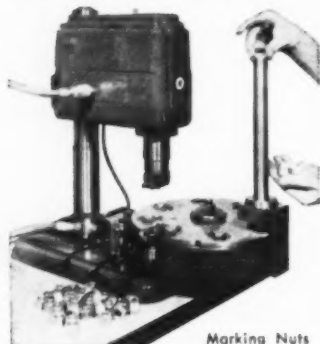
Ohio, have just placed on the market one of their newest devices, Lok-A-Blok, which is said to enable users to

MARKING IS FASTER--EASIER

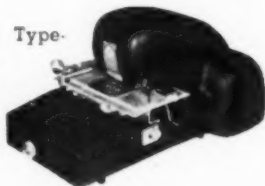
with AUTOMARK EQUIPMENT

The Automark Marking Machine is versatile . . . lending itself readily and easily to a variety of branding, staking, assembling, and marking operations; handling up to 10,000 parts per hour. Consult us on your needs.

The Automark Electric Type-writer will speed the marking of metal name plates . . . up to 75 characters per minute, marked easily and smoothly.



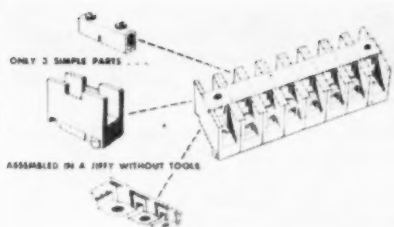
Marking Nuts



From the smallest to the largest requirements on stamps, roller dies, typeholders, or machines, we are equipped to deliver promptly, quality marking equipment.

Imperial STAMP & ENGRAVING CO., INC.

4456 N. WESTERN AVE. *Chicago* 25, ILL. • CORNELIA 7-5882



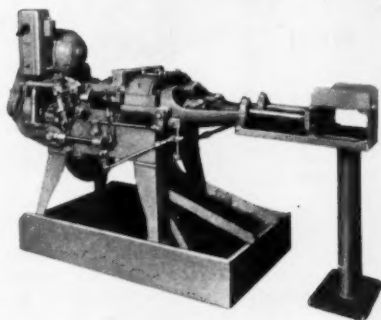
build their own terminal blocks in various lengths and combinations up to 25 poles without waste.

Lok-A-Blok consists of three simple parts which can be assembled without tools: A hand tool can be supplied which reams the necessary holes for mounting. The top is of a special "mat" finish which enables the user to mark the identifying numbers in pencil, ink or any other method.

Budd-Ranney bar machine

The improved Budd-Ranney nut blank machine, made by Miller Glass Eng. Co., Dept. BB, Columbus, Ohio, is

said to make it possible now for manufacturers and users of nut blanks from $\frac{1}{4}$ " to 2" dia. to increase production



sharply over previous methods.

Both bar stock and drills rotate simultaneously in opposite directions, thus speeding the machining operation. Revolving both stock and drill also makes for concentricity of the tap-drill hole with the body of the nut.

WHITNEY - JENSEN

METAL WORKING TOOLS

FOR 43 YEARS



NOS. 10-11-12
BALL BEARING
PUNCHES

12 **11** **10**

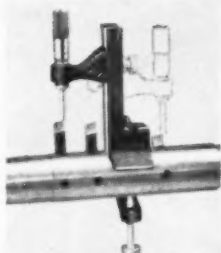
Punches with portability and power combined. Because of ball bearing screw principle, each develops over 14,000 lbs. punching pressure. No. 11 is identical to No. 10 except for tubular handles which are used for carrying extra punches and dies. No. 12 has higher and deeper throat for punching channels. Bases are available for fixed-position punching.

Capacity (all models) $\frac{3}{8}$ " through $\frac{1}{4}$ "

WHITNEY METAL TOOL COMPANY • 115 FORBES STREET, ROCKFORD, ILLINOIS

SAVE TIME

WITH
BARTELT
GAGES



Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to fixed base. Make settings in one step—eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

1218 Partridge Ave.

Beloit

Wisconsin

IMPORTANT NOTICE

The Genuine MAUSER

VERNIER CALIPER

IS NOW MADE OF
STAINLESS STEEL
THROUGHOUT



AND THE FOLLOWING
IMPROVEMENTS HAVE BEEN ADDED

- SPECIALLY LONG VERNIER to read thousandths
 - HARDENED PHOSPHOR-BRONZE adjustable giv retainer accuracy
 - 3 GRADUATIONS - 1/1000" - 1/125" - 1/10 mm in back
- Request illustrated folder showing complete line of
MAUSER Toolmakers Calipers, Height Gages, Bevel Pro-
tractors and Tool Stands.

GEO. SCHERR CO., Inc. 200 MT Lafayette St., N.Y. 12

CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding and Horizontal Boring facilities as well as modern Rowbottom Cam Milling equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-22 44th Road Long Island City 1, N. Y.

The Budd-Ranney machine is unique in that it utilizes two tools to perform the cutting-off operation, meaning savings in stock, since much narrower parting tools may be used.

Airco announces new mild steel electrode

Air Reduction Sales Co., Dept. BB, 60 East 42nd St., New York 17, N.Y., has announced the availability of a new, improved E6010 electrode, the Airco 78E, for welding mild steel in all positions.

This electrode is said to offer deep penetration without undercutting, a minimum of spatter, and uniform weld deposits without fingernailing. The deposit solidifies quickly, which especially adapts this electrode for welding in the vertical and overhead positions.

The 78E is recommended for the fabrication of mild steel involving plate and rolled sections or castings, fired and unfired pressure vessels, structural frames, pipe lines and all classes of marine work where high ductility and tensile strength are essential.

NEW PRECISION DIE SAWING & FILING MACHINE

The FM-200 Precision Die Filing & Sawing Machine has been designed for the manufacture of small and intricate dies. Only tension files are being used. They are held under tension between upper and lower file holder arm guaranteeing absolute straight filing or sawing. The upper arm is hinged to enable the operator to swing the arm upward in order to insert the die. This way the file—which is fastened in the lower holder arm—stays always lined up and does not require re-setting after each inspection. The work table can be tilted in all 4 directions up to 2° in order to file and saw tapers. All moving parts are hardened and ground for perfect fit. Variable speed drive permits any speed from 110 to 330 strokes per minute.



For Complete Details,
Write

CEDAR-WEST TOOL CO., Inc.

90 WEST STREET NEW YORK 6, N. Y.

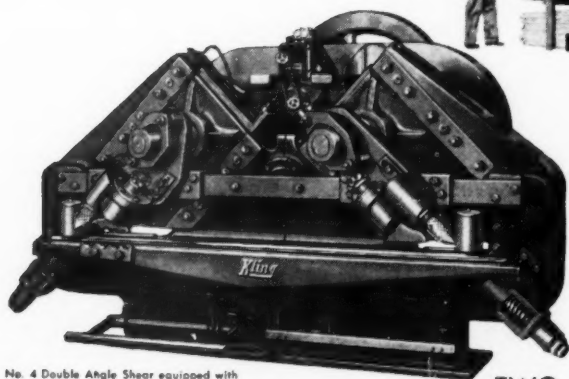
It's the **BUSIEST** machine in the shop!

...gives more cuts per day on **FLATS**



ANGLES

ROUNDS



No. 4 Double Angle Shear equipped with Automatic Lubrication System, Gear Guards and Automatic Hold-downs.

Kling

**double
angle
shears**

TWO shears in ONE machine!

If you're using obsolete, slow-poke methods of shearing, the Kling Double Angle Shear can help you save time and money. This modern compact machine is designed for high speed, high production shearing on both long and short run jobs. Many metal fabricating plants and steel warehouses have found the Kling Shear to be the workhorse of the shop. For instance, one machine will shear round bars and bar angles on the left side while the right side can be used for structural angles and flat bars. The machine is built with the speed and power to handle the bulk of your shearing requirements. For shops with considerable mitre shearing

work, Kling Double Angle Shears can be mounted on a turntable to facilitate handling. Automatic hold downs and one-shot lubrication can be furnished when desired. Sizes to handle angles up to 8" x 8" x 1½"

WANT TO CUT SHEARING COSTS?

Find out how this high-production machine, available in four sizes, can give you more cuts, cleaner cuts on your shearing operations. Write for more information and latest bulletin. Kling Bros. Engineering Works, 1323 North Kostner Avenue, Chicago 51, Illinois.

SEND FOR NEW BULLETIN 2345

5803 MMRRR

Since
1892

Kling

...an investment in speed!



Friction Saw



Combination Shear
Punch & Copers



Rotary Shears



Punch



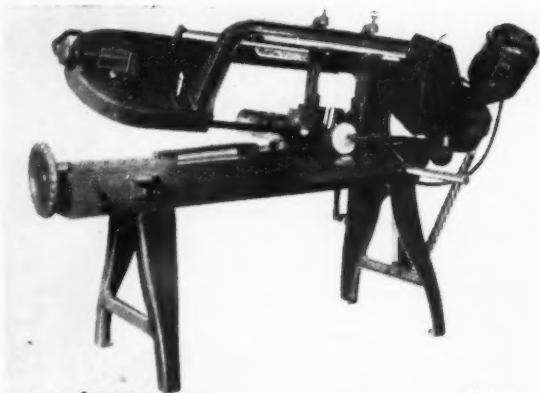
Plate Bending Rolls

Band saw uses high speed steel blade

A new horizontal band saw, announced by Wells Mfg. Corp., 707 Coolidge Ave., Three Rivers, Mich., is designed to capitalize on advantages of the new "Milford Rezipor" high speed steel band saw blade.

Design features which distinguish the Model 800, include: heavy duty counter-balance frame and beam; new style band wheels providing for use of 1" wide blades; new "constant-load" blade tensioning device; and synchronized speed blade cleaning brush.

While the Model 800 was developed especially for use with the new high speed steel blade, it also can be used effectively with standard carbon steel blades. When used with the new blade



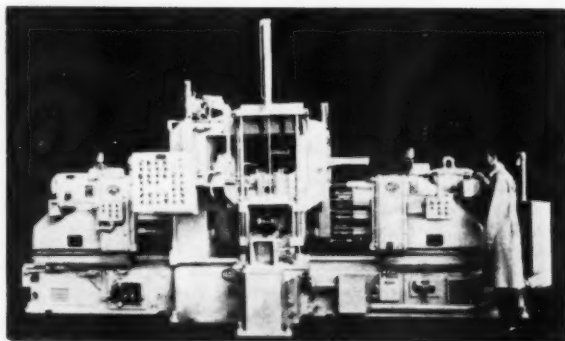
the Model 800 is claimed to have established new records for greater cutting efficiency and cuts per blade, particularly in cutting stainless steel. Capacity of the new machine is 8" in diameter.

Multi-operation machine for tractor rollers

A new 2-way Hole-steel machine has just been developed, that claims complete automation and flexibility in the loading, drilling, countersinking, tapping, and unloading of tractor track rollers, by National Automatic Tool Co., Inc., Dept. BB, Richmond, Ind.

In this machine provision is made to handle any of three sizes of rollers without changing set-up and without touching part by hand. Also, the machine handles either right or left hand parts in each of the three sizes, for extreme flexibility.

The part is rolled on a track into pre-load position at the front of the machine and then elevated automatically to a higher level which places the part in



position for rolling into position opposite the proper one of three arbors which then clamp the part automatically into the trunnion fixture.

From this loading and unloading position the machine automatically indexes and carries the part into a second position for drilling and countersinking both

ends of the part. The machine again indexes automatically and the part is in position for tapping of both ends of the part.

After the third index, the part is in unloading position and automatically unclamped and rolled on a track out of the machine. Only one of each of three sizes of tractor track roller is machined at one time. Production is 72 parts per hour.

Black granite layout plates and straight edges

Layout plates and straight edges of black granite are now being produced by Collins Microflat Co., Dept. BB, 2326 E. 8th St., Los Angeles 21, Calif.

Differing from surface plates, the layout models do not have clamping edges, but are straight-sided. Surfaces are finished to an accuracy of up to 0.0002" per foot. Plates are made in sizes from 12"x18" to 36"x48".

Straight edges come in lengths up to 48" and are used for precision measure-



ment and checking of surfaces of machine tool beds and areas where absolutely flat surfaces must be checked, with accuracies up to 0.00005". Ends are tapered and fitted with leather grips for easy, secure handling.

People work better when they SEE BETTER



At Superior Tube Co.—Inspectors use Magni-Focuser to ensure flawless hypodermic needle tubing.

MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION

Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Now aiding thousands of workers, the Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

Gives true third-dimensional ("3-D") vision

EDROY PRODUCTS CO.

480 Lexington Ave.,
Dept. 14, New York 17, N. Y.

MOTOR MICA

TRADE MARK REG. U. S. PAT. OFF.
ANTI-FRICTION COMPOUND
In White Powdered Form

COOLS
HOT
BEARINGS
QUICKLY



SAVES
WEAR
ON
MOVING
PARTS

Find out how Motor Mica can put an end to your lubricating problems. Try it with your cutting oils, in die-casting, deep-drawing, metal stamping, etc. Write on your business letterhead for free sample. No obligation.

Keeping the Wheels of Industry Cool
Since 1914

Packed in 5, 10 & 25 lb. Containers
SCIENTIFIC LUBRICANTS CO.
3469 N. Clark Street • Chicago 13, Ill.

DON'T SCRAP IT!

Ever have a tap or drill break in an expensive part? . . . so that even careful drilling couldn't save it? Today, parts costing as little as 50c can be economically salvaged by an Elox Electron Drill.* They're real money savers! No plant can afford to be without one. Write for particulars.

ELOX CORPORATION

OF MICHIGAN
732 N. Rochester Rd.
Clawson, Michigan

*T.M. Reg.

HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- SQUARE BLADES Easily Replaced.
- Simple, Accurate Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



PAT.
SHELL
MILL

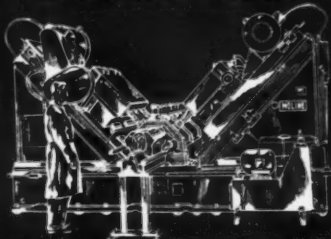
SEND FOR BULLETIN

W.T. HOWALD MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

SINCE 1901 MOLINE "Hole-Hog"

Specially Designed
MACHINE TOOLS
have cut production costs
for American Industry



Boring V-8 Engine Cylinders



DRILLING • BORING
HONING • TAPPING
and Special Machines

**ONLY ACME
OFFERS YOU**

2 BUSHING STANDARDS

ACME

Industrial Company

210 N. LAFLIN ST.
CHICAGO 7, ILL.

MAKERS OF HARDENED
AND GROUND PRECISION PARTS

A. S. A. STANDARD
Includes
7114
Different Drill
Sizes and Lengths
IN STOCK

ACME STANDARD
Includes
9870
Different Drill
Sizes and Lengths
IN STOCK

**TOTALING
16,984 SIZES**

Reduces "Specials"... Speeds Delivery... Cuts Costs

Only Acme offers two bushing standards giving you 9,870 EXTRA thin wall sizes... sizes now costing you premium prices elsewhere and delaying your production. Write for catalog.



**DIAMOND
LAPPING OIL**

... FREE SAMPLE for the sharpest carbide tools you've ever had ! !

Now you can try amazing STADOIL for your diamond wheels—without cost! You'll get the same precision tool finishes already acclaimed by the more than 6,500 present users. Your diamond wheel manufacturer highly recommends STADOIL to remove gum or glaze and keep wheels from loading. One 8 ounce sample can will prove all we say about STADOIL... so clip the coupon and ORDER SAMPLE TODAY.

STADOIL MFG. CO.
Dept. MTB-11, El Monte, Calif.

Please send postpaid the 8 ounce FREE
SAMPLE of STADOIL.

Name & Title

Company

Address

Distributor

STADOIL MANUFACTURING CO., EL MONTE 3, CALIF., U.S.A.

Get a better "SURFACE GRINDER" job at less cost

ORDER DIRECT on our 10 day money back guarantee.

RADIUS DRESSER \$39.00

Diamond \$7.00



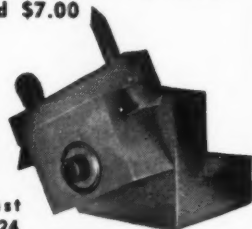
Hardened shaft—Bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON
Grinders — \$44.00, Diamond \$7.00.

SPECIAL 14" Wheel Size \$95.00.

ANGLE DRESSER \$44.00

Diamond \$7.00



Ball Thrust
Bearings. 24

Precision Ground Surfaces. Can be set
very accurately with a Protractor. Works
underneath the wheel. Large bearing
surfaces.

THE "MIGHTY MIDGET" LINE

SPERMAN METAL SPECIALTIES • 2199 EAST 21st ST. • BROOKLYN 29, N. Y.

Plastic covers for balancing ways

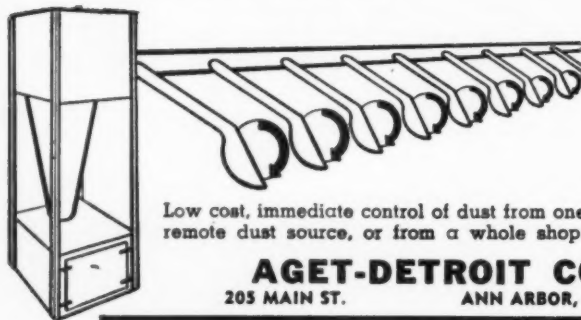
The Anderson Bros. Mfg. Co., Dept.
BB, 1907 Kishwaukee St., Rockford,
Ill., is now offering fitted plastic covers
to protect the sensitivity and accuracy
of their balancing ways for dust, emery,

or other particles that might settle in
the bearings.

Durable and washable, the covers are
easy to slip on and off and are avail-
able for the Anderson 20", 40" and
60" balancing ways.

STOP DUST

with **DUSTKOP**



Low cost, immediate control of dust from one
remote dust source, or from a whole shop!

AGET-DETROIT CO.

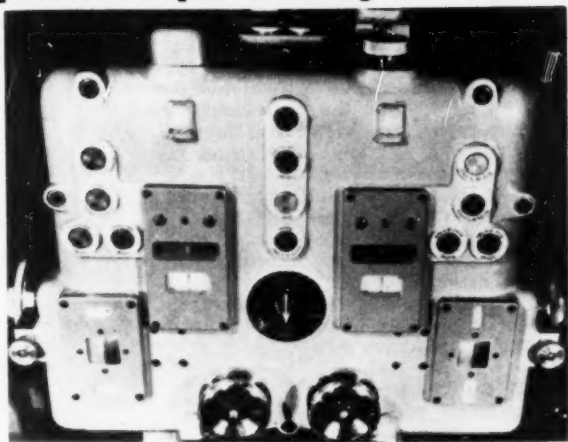
205 MAIN ST.

ANN ARBOR, MICH.

300 cfm to 10,000 cfm
per unit (22 models)
standard, pre-tested,
available from stock.
Ask for catalog 605-2.
No obligation.

Pre-selective Autopositioner speeds boring

A pre-selective autopositioner developed by Herbert Lindner, G.m.b.H., and incorporated in the latest model LB 15 Lindner jig borer, distributed by Kurt Orban Co., Inc., Dept. BB, 205 E. 42nd St., New York 17, N.Y., is said to permit the operator to preselect the table position for the next hole while one boring operation is in progress. An optical projection system of making settings, in conjunction with a photoelectric zero point indicator, permits exact centering with a minimum of visual fatigue and with the human error factor greatly reduced. An illuminated projection screen with an integral reticle shows an image of the desired location line from the cylindrical mea-



suring scale. As this image approaches the reticle, the photoelectric system is energized, and a pointer swings in the direction of the optical image. As the image approaches the center of the reti-

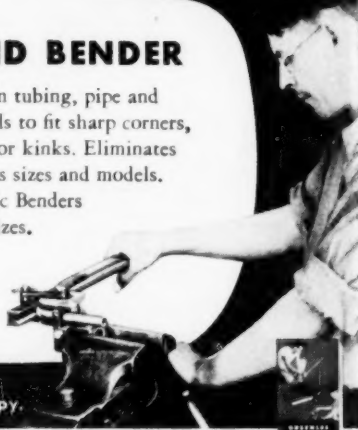
Quickly bend tubing, pipe, conduit...

with a GREENLEE HAND BENDER

Swiftly produces accurate small-radius bends in tubing, pipe and conduit. Especially designed to form neat bends to fit sharp corners, nooks and other close quarters. No flattening or kinks. Eliminates many manufactured bends and fittings. Various sizes and models. Handy companion tool to GREENLEE Hydraulic Benders for bending larger pipe and conduit up to 5" sizes.



FREE BENDER BOOK Complete facts on timesaving Greenlee Pipe Benders. Write for copy.



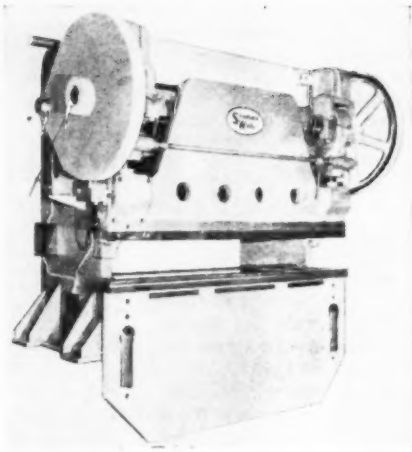
GREENLEE TOOL CO., 2011 HERBERT AVE, ROCKFORD, ILLINOIS

cle, the pointer follows its motion. When the image is exactly centered, the pointer also reaches center position.

By means of a switch on the Auto-positioner, either one of two methods can be chosen for the preselection of table settings: the coordinate method, in which the positions of all holes are expressed in terms of their distances from a fixed zero point; or the additive method, in which each hole is positioned by its longitudinal and transverse distance from the preceding hole. Basic principles of operation of the Auto-positioner are the same in either case. Table settings are guaranteed accurate to .00015"; readings in .00005".

400-ton brake by Struthers Wells

A new 400-ton capacity press brake has been added to the Struthers Wells line of sheet metal forming equipment. Designated the Model 400-PB-8, this latest development brings to 44 the number of press brake models produced by Struthers Wells Corp., Machinery Div., Dept. BB, Titusville, Pa. It will



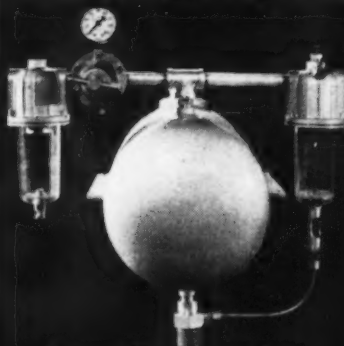
form steel up to $\frac{3}{4}$ " in thickness and 8' in width. Others in the line will handle metal in thicknesses up to $\frac{7}{8}$ " and from 4' to 22' in width.

The Model 400-PB-8 Press Brake, one of a series of six in the 400 ton

KEEP CUTTING TOOLS AND WORK AT ROOM TEMPERATURES

with the revolutionary new cooling system

LO-JET ACRO



One unit can service
up to 8 operations

CUTS COSTS

USED FOR ALL
MACHINING
OPERATIONS
IT'S CLEAN

PROLONGS TOOL LIFE

CUTS TOOL
BREAKAGE LOSS
SPEEDS
PRODUCTION

Controlled compressed air operation for all types of metal cutting with special ACRO COOLANT soluble solution.

Our engineering staff will cooperate FREE of charge. Send blue-prints for estimate.

Write now for more information with
no obligation to you!

AIR CONVERSION RESEARCH
corporation Dept. M.T.

4107 north damen avenue, chicago 18, illinois

Why break your back. . . SAVE TIME, LABOR, MONEY with

Medelton
Motor
Driven

"Powerroll"

\$270.00
F. O. B. N. Y.
800 LBS. CAP.

FEATURES . . .

- Eliminates hazards of lifting heavy rolls.
- Roll on your coil and it's ready to go.
- Slack loop prevents drag on feed or dies.
- 30% to 40% higher daily production on hand or automatic feeds.
- Re-loading time kept to a minimum.
- No pulling of coils, avoids operator's fatigue, and results in faster feeding.

Write for circular. Dealer inquiries invited

WM. HALPERN & CO., INC.
Machine Tools

100 STEVENS AVE. 245 CONNECTICUT AVE.
MT. VERNON, N.Y. BRIDGEPORT, CONN.

\$357.00
F.O.B. N.Y.
2000 LBS. CAP.

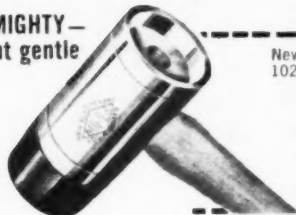


Use
NUPLA
hammers

The one soft-faced line
serving all industry

with
interchangeable
NUPLAFLEX tips

**MIGHTY—
but gentle**



Tighten the Reins — Stop Loose Buying

SIMPLIFY — SAVE INVENTORY NUPLA hammers with their complete size and weight selection do the **whole** job... easily interchangeable NUPLAFLEX TIPS in 5 hardnesses meet all soft-faced pounding requirements... replace rubber, rawhide, lead, plastic and all other lines of soft-faced hammers.

HAVE TREMENDOUS ECONOMY APPEAL Super-durable NUPLA hammers have **proved** to outwear ordinary hammers 10-50 to 1... and have played important roles in many cost reduction programs. Write for actual case histories.

THE CHOICE OF INDUSTRY Many users **specify** NUPLA with NUPLAFLEX TIPS, including General Motors, Chrysler, Allis-Chalmers, Ford, Lockheed, Westinghouse, the Army, Navy and Air Force.

WORKERS PREFER THEM NUPLA hammers provide solid blows without sting... reduce fatigue. Also safety tools... non-chipping, no flying particles, sparkproof.

New Plastic Corporation,
1026 North Sycamore, Dept. No. 100, Los Angeles 38, California

Please tell me how to increase the efficiency and reduce the costs of my pounding operations with NUPLA hammers.

Name

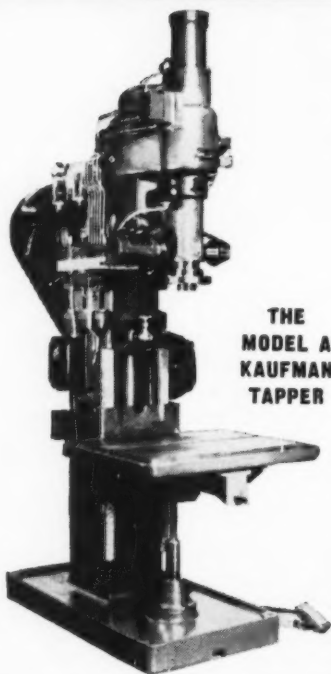
Street Address

City

Zone

State

KAUFMAN TAPPING MACHINES



THE
MODEL A
KAUFMAN
TAPPER

Kaufman has specialized for many years in the building of tapping machines. Every machine is precision-built to meet the requirements of individual production jobs. Built with fully automatic cycle, single or multiple spindle heads and other most advanced features.

Send prints and sample of your work for further information and recommendations on how Kaufman Tapping Machines can reduce your production costs.

Catalog Number 1153 mailed on request

KAUFMAN MFG. CO.

547 SOUTH 25TH STREET
MANITOWOC, WISCONSIN

class, is said to afford the operator complete control at all times with instant stopping of the ram at any point. It is provided with pneumatic clutch and separate brake, operating controls for cycling and inching, plus control for a single work stroke with return of the ram to "up" position.

Pneumatic triplets

Three new pneumatic impact wrenches, manufactured by Mall Tool Co., Dept. BB, 7725 S. Chicago Ave., Chicago 19, Ill., offer capacity, power and size to meet individual needs, for all tightening or removing of bolts and nuts, for removing of broken cap screws and studs, the manufacturer claims. They do tapping, reaming and drive and



remove lag screws and screw spikes. The Model PW-5014S, the "Squatty," takes $\frac{3}{8}$ " bolt or nut; its spindle has $\frac{3}{4}$ " square drive; speed is 1600 r.p.m. free at 90 p.s.i.

The Model PW-4012P takes $\frac{3}{4}$ " bolt or nut; spindle has $\frac{3}{4}$ " square drive; speed is 1300 r.p.m. free at 90 p.s.i. Model PW-308P has capacity of $\frac{1}{2}$ " bolt or nut; spindle has $\frac{1}{2}$ " square drive;

When You Specify **"CHICAGO"**
THREADED PRODUCTS
You Get **FASTER SERVICE**

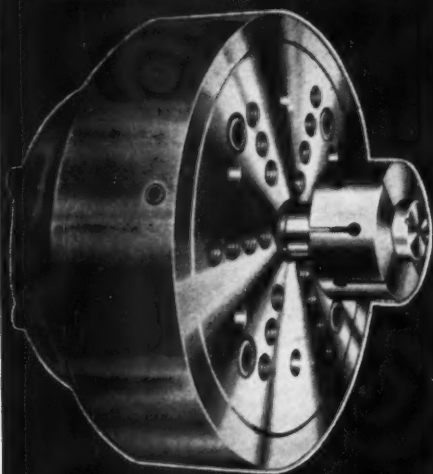
Our more complete stocks mean "at once" shipments of quality fasteners when you need them—no production delays—no maintenance "shut downs."

"Chicago" quality threaded products include: Hexagon Head Cap Screws, Bright and Heat Treated Grade 5 • Square Head and Headless Set Screws • Hexagon Nuts • Hexagon Castellated Nuts • Socket Head Cap Screws • Socket Set Screws • Socket Pipe Plugs.

To Speed deliveries to you, order "Chicago" products from your nearest Industrial Supply Distributor. He carries a complete stock of our products—he will gladly furnish you with samples—his familiarity with your local field conditions enables him to fill your needs promptly and correctly.

The **CHICAGO SCREW COMPANY**

2507 WASHINGTON BOULEVARD
BELLWOOD, ILLINOIS



9 Reasons for You
to get the Facts on
SPEEDGRIP CHUCKS

1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
9. Service is prompt.

**Speedgrip Precision
Internal Chucks will save
you money on second
operation work.**

WRITE FOR FREE MANUAL



SPEEDGRIP CHUCK

820 N. WARD STREET
ELKHART, INDIANA

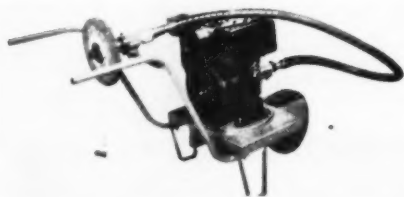
wrench has free speed of 1400 r.p.m. at 90 p.s.i.

All three models have five vane rotary type air motor, built-in automatic oiler, and pin lock.

Mobile grinder

The Franklin Balmar Corp., Dept. BB, N. A. Strand Div., Baltimore, Md., has announced the introduction of a new gasoline-engine-powered flexible shaft grinder.

Designated as Model DGX-7, grinder is said to eliminate need for air com-



pressors. Unit consists of a 5 h.p. gasoline engine mounted on a wheelbarrow

type truck. A 7' flexible shaft is attached directly to shaft of motor. A $\frac{3}{4}$ " capacity arbor style hand spindle at end of shaft takes any conventional flexible shaft tool and grinding wheels up to 10"x1 $\frac{1}{2}$ ". Right angle handpieces are also available.

Engine is mounted on platform by means of a swiveled base. The base moves a full 180°, thus allowing use of shaft in any direction. Swivel plate itself locks in five different operating positions. Unit can also be used as a fixed bench tool.

Backing on diamond wheels

Diamond Tool Research Co., Inc., Dept. BB, 305 E. 45th St., New York 17, N. Y., announces a new backing for straight periphery diamond wheels. A high aluminum powder content in the plastic back is said to give excellent heat conductivity which makes for fast, cool cutting and long wheel life. Even the large 10" diameter wheels are claimed to run true without the uneven distortion frequently induced in this type wheel by harmonic vibra-

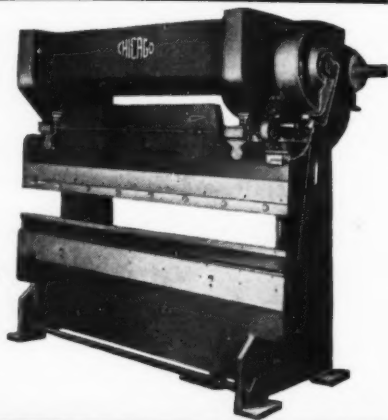


STEEL PRESS BRAKES

43 Standard Sizes

Readily adapted for a wide variety of bending, forming, drawing, notching, blanking, punching, embossing, etc.

DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



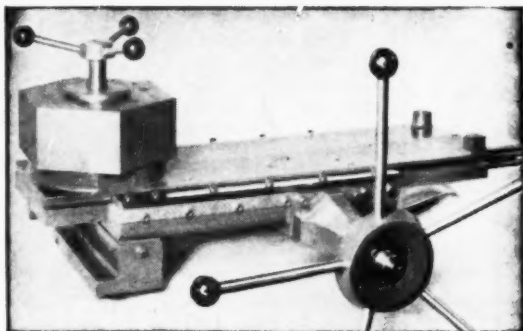
DREIS & KRUMP

MANUFACTURING COMPANY

7440 S. Loomis Boulevard, Chicago 36, Illinois



LYNN Turret Series F-BT3—for Lathe Swing 15" to 26"



Head 9 1/2"
 Tool Hole 1 1/2" to 2"
 Working Travel 10 1/2"
 Over-all Length 35"
 Swings 6" Box Tools
 Weight 470 lbs.
 Self-Indexing for Fast Production
 Easily Adjustable for Alignment and Wear
 Less Experience Needed to Operate

*Turrets available for smaller Lathes
 Write, or Phone ATLantic 7267*

*Only manufacturer of
 large conversion turrets.*

LYNN MANUFACTURING CO.
 1121 South Seventh St. Minneapolis, Minn.

HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See How
 You Can Improve Your Production*

WICACO

SINCE
 1868

MACHINE CORPORATION

WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of
 Precision Machinery and Machine Parts
 Roller Bearing Twister Spindles—Spindle Oiling Machine
 Precision Internal Grinder—Screw Machine Products



The
P-M
Single and Multi
STEP DRILL

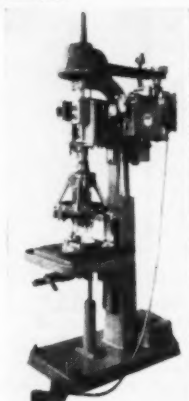


P-M COMPANY
147 GRAND ST. • NEW YORK 13, N. Y.

tions. All straight wheels are being made with the new backing.

Heavy-duty air thrust drilling and tapping machines

The Beckett-Harcum Co., Inc., Dept. BB, Wilmington, O., is now manufacturing a line of heavy-duty drilling and tapping machines equipped with electrically controlled air-powered thrust. Two models are produced: Model C-16 Air Thrust drilling machine and Model C-16-T Air Thrust drilling



machine. Both models are available as box column, floor-stand type, having sliding head and adjustable work table, and as bench and table multiple unit combinations having two, three or four head units, either C-16 or C-16-T models.

The Model C-16-T unit is designed primarily for production multiple drilling and tapping in a wide range of sizes. It is said to put relatively short-run jobs into the high production class because of the ability to drill parts and tap them from the same fixture. This versatile unit performs single and multiple tapping direct from the drill chuck or standard multiple drill head, without employing a clutch or lead screw.

Removing zinc deposits from deburring stones

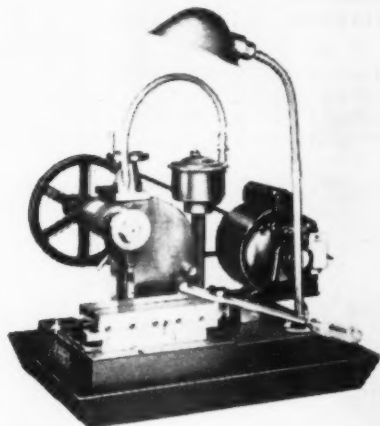
The Magnus Chemical Co., Dept. BB, South Ave., Garwood, N. J., announces a simple method of removing the metallic zinc coating which deposits on deburring stones when zinc die castings are barrel-deburred.

D-Scale-R is a solid, inert material which does not produce acid action until dissolved in water. Hence it is safe to ship, handle and store, with none of the hazards of raw mineral acids. It is inhibited against harmful acid action.

Viking bench-type mill handles wide range of operations

A new, bench-type mill, adaptable to a wide range of light milling operations, is announced by Viking Industries, Dept. BB, 220 Montague St., Rockford, Ill.

Adaptable for varied jobs, the Viking mill can be used for making key ways, slotting, splitting, squaring at different



angles, milling flat spots on small shafts, spline cutting, small screw slotting, and many other similar applications. Interchangeable pulleys make possible a wide range of speeds up to 7,000 r.p.m. The complete unit is light and easily portable. Base dimensions are only 11" x 18", requiring little bench space.

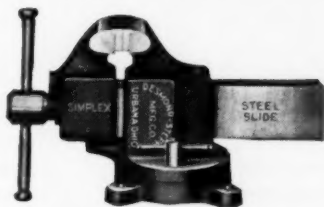
Universal table

When used on a drill press, South Bend's new Universal table is said to accurately space drilled holes and by chucking an end mill, the drill press converts to a light milling machine. By attaching the universal table to the face plate of a lathe, spaced holes for jigs and die blocks can be bored with micrometer accuracy. It is made by South Bend Lathe, South Bend 22, Ind.

The upper and lower tables are identical, and the upper table may be removed when it is not needed. Both

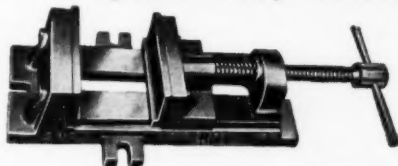
DESMOND

vice features add
many hands . . .



MACHINIST'S VISE—exclusive unbreakable steel slide, enclosed screw, one-piece handle. Many models built for every vise application. Heavy duty, fully guaranteed.

. . . speed shop work



DRILL-PRESS, MILLING-MACHINE VISES—strong construction, removable brass bushings, replaceable or permanent straight jaw faces, protected base. For medium and heavy duty.

USE THIS CONVENIENT COUPON

THE DESMOND-STEPHAN MFG. CO.
Urbana, Ohio

Gentlemen: Please send me Desmond's new 'application illustrated Vise Catalog No. 60', without obligation.

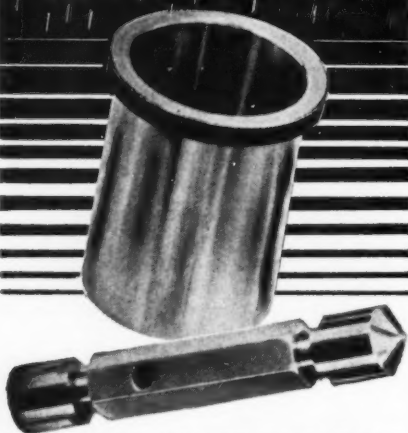
Name.....

Firm.....

Address.....

Desmond
SIMPLEX VISES

FOR ACCURACY IN PRODUCTION



ECONOMY PRECISION BUSHINGS AND GAGES WORK HAND IN HAND



- A.S.A. standard and special drill jig bushings.
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.

Write for bulletin and price list.

Economy

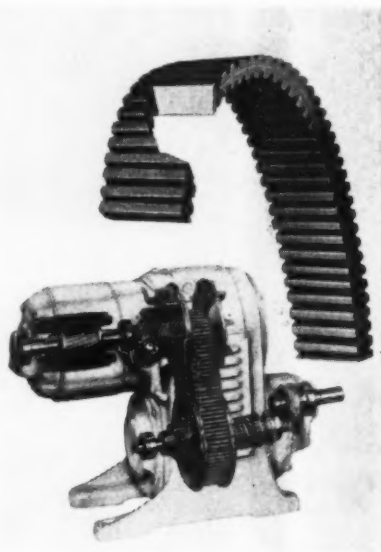
TOOL & MACHINE CO.

1829 S. 68TH ST., MILWAUKEE 14, WIS.

the upper and lower slides have a maximum travel of 4" and revolve on graduated swivels through 360°. The slides may be used without graduated swivels to reduce height if desired. The two feed screws are equipped with micrometer collars reading in thousandths of an inch. Measuring 4" x 8 7/8", each precision ground work table has four slots for clamp bolts.

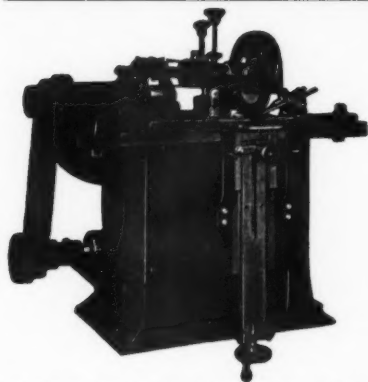
Double-ribbed v-belt for variable speed motors

U. S. Electrical Motors Inc., Dept. BB, Box 2058, Los Angeles 54, Calif., announce an improvement in a double-ribbed v-belt that is said to reduce internal friction and permit greater flexi-



bility, allowing greater speeds and smaller diameters, without sacrificing strength.

Varibelts are constructed of a type of rubber that is said to be very durable. They are built up in layers, then cured under pressure in precision molds. Highest resistance to heat, oil or grease is claimed.



Wardwell Model EC Combination Grinder
The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. • This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

sharpening 1 gross of hack saw blades **PAYS** for this machine!

One gross of hack saw blades can be resharpened at least 6 times—actually saving you the price of the machine!

Wardwell EC Grinder gives old blades a keener, longer lasting cutting edge—because new blades are usually not ground after hardening.

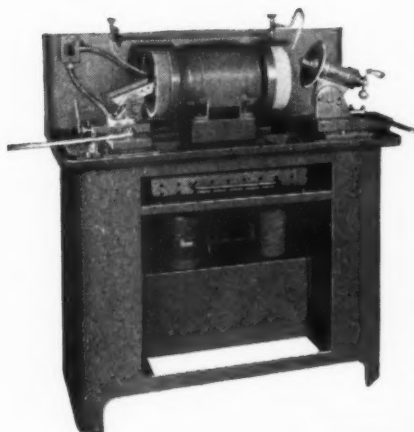
Wardwell EC wheels will not burn, anneal or injure hardness of teeth. Sharpen Circular, Hack or Band Saw blades on one machine!

WRITE FOR BULLETIN EC TODAY

Complete Wardwell Catalog describing more than 30 grinding, sharpening, setting and swaging machines also available.

THE WARDWELL

MANUFACTURING CO.
3807 Ridge Rd., Cleveland 9, Ohio



*Request
Circular,
Today.*

Continental **CHASER AND CUT-OFF WHEEL GRINDER** *Keeps tools sharp*

One machine does both—it sharpens pipe thread chasers at one end—and pipe and tube cut-off wheels at the other end. Keeps your tools ready for instant use—always sharp. *Also, Manufacturers of Cut-Off Machines and Wheels.*

Continental **MACHINE CO.**
—SINCE 1919—

1952 N. MAUD AVE. • CHICAGO 14, ILL.

WESPO

T-BOLTS

**BOLSTER & T-SLOT
TYPES**

to J. I. C.

press room standards

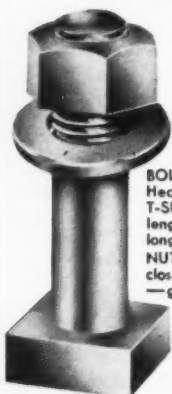
Forged, precision machined
heat treated. Tensile
strength 150,000 lbs.

SIZES

BOLSTER BOLTS—dia. to $1\frac{1}{2}$ "
Heads sq. to 3" hex. to $2\frac{3}{8}$ "
T-Slot bolts, $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{3}{4}$ " dia.
lengths to 12". 1" dia. 4" to 22"
long.

NUTS—hardened—threaded to
close fit. **WASHERS**—hardened
—ground both sides.

Write for bulletin-prices
WEST POINT MFG. CO.
26931 W. 7 Mile Rd.
Detroit 19, Mich.



**Micro
Supreme**

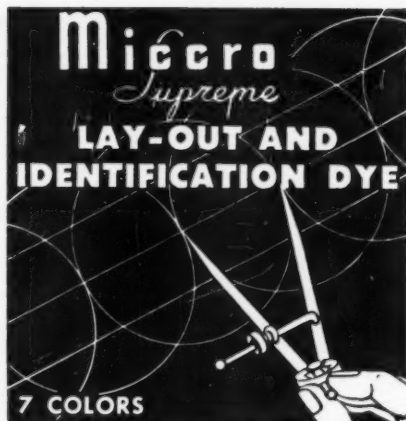
LAY-OUT AND IDENTIFICATION DYE

7 COLORS

For Tool, Die, Pattern or Template layout on
metal . . . Quick identification of bar stock,
sheets, strips or parts . . . Shows up in
sharp relief—dries instantly . . . Write for
sample and circular on company letterhead.

**MICHIGAN CHROME &
CHEMICAL COMPANY**

8615 Grinnell Ave. • Detroit 13, Mich.



Over 85% of the torque wrenches used in industry are

STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

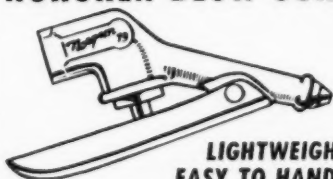
in inch ounces
... inch pounds
... foot pounds
(All sizes from
0-6000 ft. lbs.)

Every manufacturer,
design and production
men should have this valu-
able data. Sent upon request.

P.A. **STURTEVANT CO.**
ADDISON [QUALITY] ILLINOIS



NORGREN BLOW GUNS



**LIGHTWEIGHT,
EASY TO HANDLE**

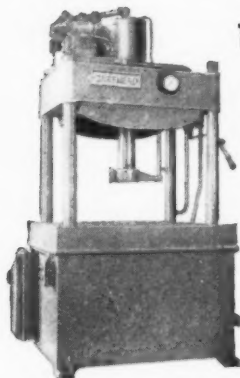
Simple, economical means of removing
metal chips, dust and other undesir-
able matter from parts, machinery, etc.
Control of air from puff to blast.

Write for catalog sheet 476, describ-
ing $\frac{1}{4}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ " models...also
patented Norgren Flex-tip Blow Gun.

Norgren
C. A. CO.

3438 So. Elati St., Englewood
In Colorful Colorado
Valves • Filters • Regulators
Lubricators • Hose Assemblies

HYDRAULIC PRESSES



1½ to 75 ton
Capacity

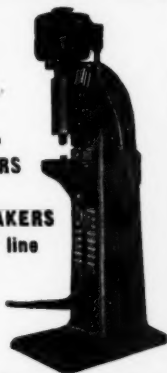
Send for
Catalog
Showing
Complete
Line

GREENERD ARBOR PRESS CO.
141 CROWN ST. • NASHUA, N.H.

GRANT

RIVETERS . .

PIONEERS
and
PACEMAKERS
in their line



—head rivets from smallest to ½" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 3, Conn.

"DAVIS" KEYSEATERS

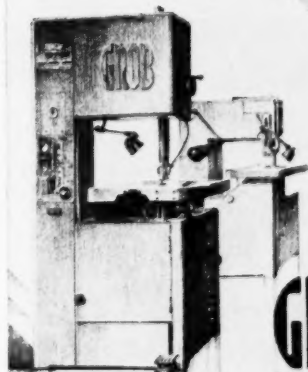


are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO.
407½ Exchange St. Rochester 8, N. Y.

SAWING MILLING



**GROB
BROTHERS**

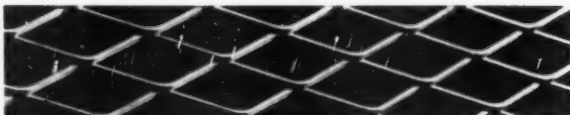
GRAFTON WISCONSIN

Expanded aluminum mesh is durable, versatile

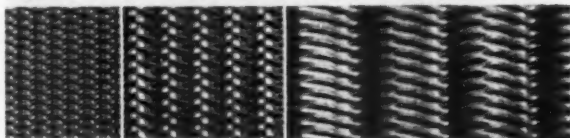
A new form of aluminum mesh—Expamet expanded aluminum—has been introduced into the United States by British Industries Corp., Dept. AB, 164 Duane St., New York 13, N.Y.

Said to have many general industrial and decorative applications, material is made in a variety of metallic and opalescent colors, and is characterized by diamond-shaped and other special meshes. It is light in weight, and will not rust; can be dyed and anodized in a wide range of colors which will not peel, chip or flake, it is claimed.

Expanded aluminum is used for grilles and other radio and electronic applications, machinery guards, tree guards, fire screens, frame-work for coaches and trucks, air-filters, meat lockers, electrical screening, etc.



STANDARD DIAMOND SHAPE IN A VARIETY OF MESHES



SPECIAL MESHES, DIFFERING FROM THE NORMAL DIAMOND SHAPE

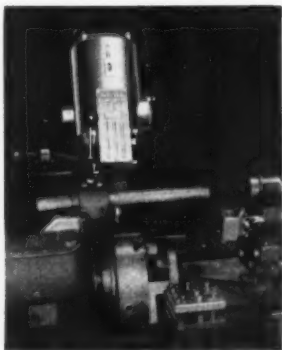
Improve link belting

Two new features have been added to V link belting, it has been announced by the Brammer Corp., Dept. BB, 684 Broadway, New York 12, N.Y.

First is a simplified size identifica-



MODERNIZE YOUR PRESENT EQUIPMENT WITH THE FEN AUTOMATIC WRENCH



Illustrated above is a Model 6M unit operating a 15" dia. chuck, which is holding a ring gear forging.

These wrenches will cut chucking time as much 60%. They speed up work by transferring non-productive chucking time to the "production" column.

For detailed information regarding the application of the Fen Automatic Wrench to your machine, phone, wire or write.

THE FEN
MACHINE COMPANY
28914 Lakeland Blvd.
Wickliffe, Ohio

tion system. All Brammer belts will now have the size symbol of the belting embossed on each rivet head.

Second feature is a new natural rub-

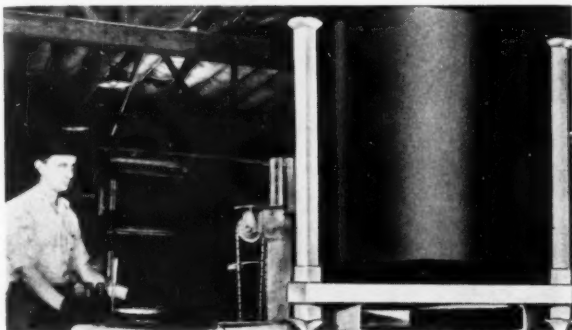
ber compound which greatly increases the flexibility of each link, and does away with assembly difficulties.

Paltier triangular coil rack facilitates storage

Several noteworthy features are said to characterize the triangular coil rack made by the Paltier Corp., Dept. BB, 1701 Kentucky St., Michigan City, Ind. Three-point suspension permits stable stacking. It can be picked up from any angle, 6-way entry, stacked and moved easily with fork lift truck, hand pallet truck or overhead hoist.

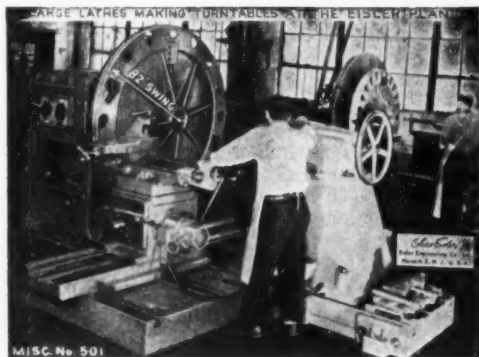
When equipped with casters or set on a dolly, rack can be moved manually.

With wood or steel rectangular or square deck, it can be converted into a



standard rack for storing small irregularly shaped parts, cartons or other shapes. There are no standard sizes or load capacities; rack is designed, engineered and produced to user's requirements.

LARGE LATHE Work To Your Order



SEND B-P FOR ESTIMATING



CAMS

TO YOUR

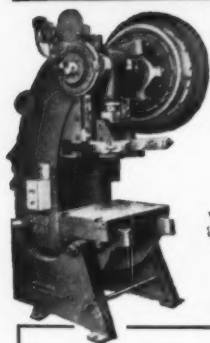
SPECIFICATION

EISLER ENGINEERING CO., INC.

762 SO. 13th STREET

NEWARK 3, N. J.

ROBINSON



The Press With ALL Of The Important Features Needed For Better Performance, Extra Safety, Higher Speed.



For almost a half century leading industrialists throughout America have depended on Robinson presses for ALL of the important improvements in the punch press field.

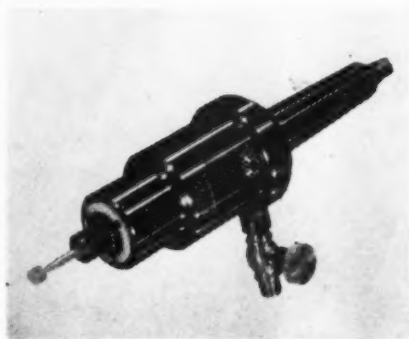
Robinson presses are available (in either standard or air clutch models) in a complete capacity range, and all of them are fully described in our latest brochure which also includes detailed specifications. You may request a copy without incurring any obligation.

New Albany Machine Mfg. Co.
New Albany, Ind.

Vulcanaire spindle improvement

One of the first attempts to reduce air noise caused by air discharge, in high speed air operated spindles, is termed a success by Vulcan Tool, the manufacturers of Vulcanaire high speed spindles, Dept. BB, 730 Lorain Ave., Dayton 10, Ohio.

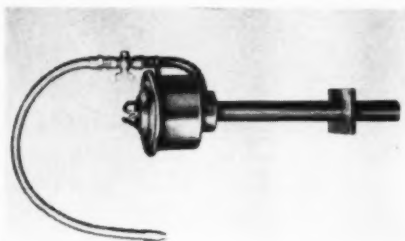
The muffler now being installed in



all new Vulcanaire jig grinders and spindles is for use with this equipment only and is said to eliminate approximately 60% of air noise due to discharge.

Motor-driven coolant pump

A self-contained motor-driven coolant pump that is said to be quickly and easily adaptable to a wide range of work is announced by Viking Industries, Dept. BB, 200 Montague St., Rockford, Ill. The new model is individually powered by a 1/30 h.p. oil-sealed motor and is designed to operate efficiently with all types of water soluble coolants and oils



up to 20 SAE viscosity.

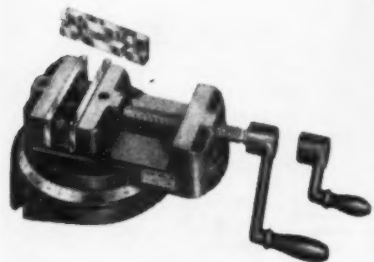
Ideal for interchangeable applications, it has a rated capacity of 100 g.p.h. at a 1-ft. head. The motor is a shaded pole type, operating on standard 110 v., 60-cycle a.c. at 1500 r.p.m. The centrifugal pump is mounted directly on the extended drive shaft of the motor. The inlet pipe has a $\frac{1}{2}$ " opening and is equipped with an automatic foot valve to hold prime. Flexible spout outlet is $\frac{1}{4}$ ".

The complete unit weighs three pounds, measures $4\frac{1}{2}$ " in diameter x 15" high. The housing is made from heavy duty brass, and the spout is flexible spring steel tubing connected to a copper shut-off cock.

Rigidity in milling vise

The Kenco Mfg. Co., 5211 Telegraph Rd., Dept. BB, Los Angeles 22, Calif., announces a new 6" milling vise, said to afford the operator maximum rigidity at all times, as their precision-made parts are vibration-free. The vise body is secured to the base by means of three bolts directly beneath where the work is clamped, thus eliminating any possibility of vibration.

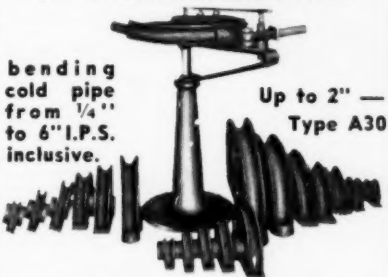
The swivel base is graduated at a 45° angle to the operator for easy reading. Graduations are from 0° to 90° and back to 0°. Markers are located right and left and give identical readings. The movable jaw is secured by means of a slide plate and can be locked solid after the work is clamped in position, again adding to the rigidity.



"The American"

LINE OF COLD PIPE,
CONDUIT AND HEAVY
WALL TUBE BENDERS
HAND AND POWER

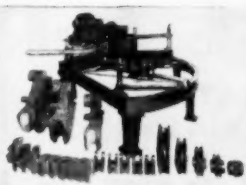
ONE OF 10 HAND-OPERATED TYPES



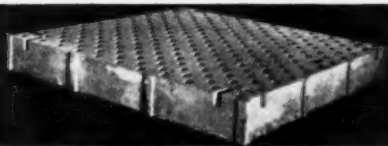
bending
cold pipe
from $\frac{1}{4}$ "
to 6" I.P.S.
inclusive.

Up to 2" —
Type A30

MOTOR-POWERED TYPE E AND F



5 and $7\frac{1}{2}$
h.p. —
Bend up
to 90°
without a
mandrel.
Motor-
Operated
capacities
 $2\frac{1}{2}$ " to 6"
inclusive.

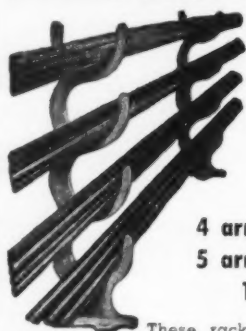


COMBINATION BENDING TABLES

For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. ($3\frac{1}{2}$ ' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

AMERICAN PIPE BENDING MACHINE CO., INC.
9 Furnace Street, Poultney, Vermont

The New Improved HANDIEST RACK



for BAR
STOCK of
all kinds

4 arms 51" high
5 arms 57" high
13" wide

Make
double
racks by
placing back
to back

These racks save $\frac{3}{4}$ the
usual floor and height
space. Cost is small and
only once. Remarkable
capacity. Write for prices
and information.

THE YOHE SUPPLY CO.
CANTON 4, OHIO

MARK and DEMAGNETIZE IN ONE OPERATION

THE
Luma
TOLEDO, OHIO
WAY



The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil.

Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-H TOLEDO 1, OHIO

CLEAR

NAMEPLATE MARKING

MODEL
No. 4



The nameplate on
your product is your
signature; keeps it
neat and legible! Ac-
curate location and
alignment are assured

with this
NAMEPLATE
DETAIL PRESS

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.



1804 W. BELLE PLAINE AVE.
CHICAGO - 13 - ILLINOIS

STEEL
Stanho
PRODUCTS

FLAT BOTTOM
**WOODRUFF
KEYS**

**MACHINE
KEYS**



**TAPER
PINS**



the Quality Line

of Precision Made Steel Products

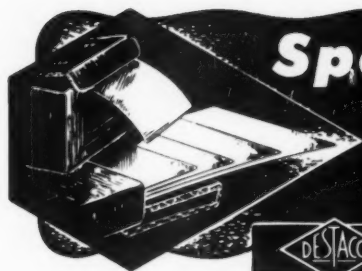
KEYS-ALL TYPES • COTTER PINS
TAPER PINS • STRAIGHT PINS
MACHINE RACK • SPECIAL PARTS

KOOLHEAD Foundry Chill Nails

WRITE FOR
DESCRIPTION
and PRICES

STANDARD

Since 1872 **HORSE NAIL CORP.**
NEW BRIGHTON, PA.



Specify



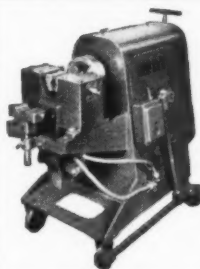
**SHIM
STOCK**

Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015", sheets 6" x 12", coils 120', identified every 6' by thickness and amount remaining on roll.



DETROIT STAMPING COMPANY

347 MIDLAND AVENUE • DETROIT 3, MICHIGAN



for chamfering bar stock

PRIOR TO SCREW MACHINE OPERATIONS

The KENT BAR POINTER

Entirely self-contained. Manual or pneumatic operated feed and gripping mechanism. Capacity $\frac{3}{8}$ " minimum diameter up to 2 $\frac{1}{4}$ " hexagon. Stationary and portable.

Literature available.

The KENT MACHINE CO. Cuyahoga Falls, O.

Drillers • Threaders • Slotters • Countersinkers • Bar Pointers

Specify ROGERS

**Cut your reaming costs in half
with the inserted blade — both
adjustable and replaceable.**

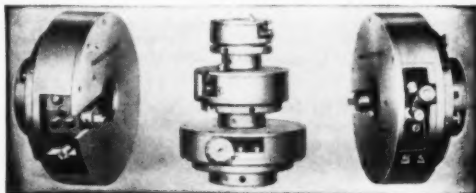


Rogers **ADJUSTABLE BLADE REAMERS** combine low initial cost with **fractional replacement cost** after inserted blades are worn to adjustment limit.

JOHN M. ROGERS TOOL COMPANY

SINCE 1885

GLOUCESTER CITY, N. J.



**MUMMERT-DIXON
FACING HEADS**

with Automatic Feed

One-way Tool Feed—6, 9 and 10" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

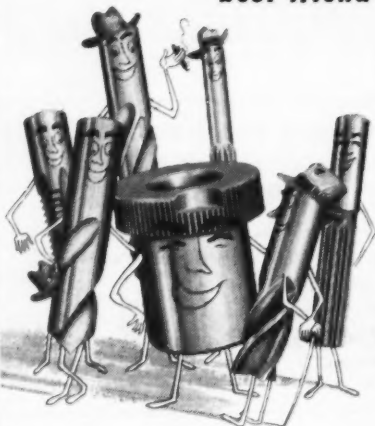
Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

UNIVERSAL DRILL BUSHINGS

*the production-tools'
best friend*



**reduce tool wear • help
prevent tool breakage •
prolong tool life**

Universal Bushings help keep tool costs down for several reasons: their super-finish bore helps reduce tool wear • their blended radius helps prevent tool hang-up and breakage • their 100% concentricity and hardness tests insure accuracy and uniform high quality • their knurled heads provide quick, sure grip • available in a complete range of standard diameters and lengths • For complete information, write to the office nearest you—Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Avenue, Kenosha, Wis. — or the home office.

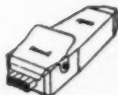
**UNIVERSAL
ENGINEERING COMPANY**
FRANKENMUTH 10, MICHIGAN

176-B

ACROMARK FOR

HERCULES HOLDERS

and Shoulder Style
Steel Type for number-
ing.



SPEED MODEL

Numbering
Machines for
consecutive
or random
numbering in
a press.



Model HN Number-
ing Machines
—Hand Style.
All numbers on
each wheel.

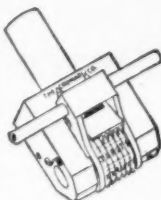


ACROMARKER

Name-Plate stamping
machines are made
in several models
and sizes for hand
or foot operation.

AUTOMATIC NUMBERING HEADS

Numbering head
shown consecutive-
ly numbers steel
parts or name-
plates. Used in a
punch press, foot
or arbor press.
Hand styles also
available.



ACROMARK

Series 9A Marking Ma-
chines are adaptable to
marking just about any
product or material. Use
straight dies for mark-
ing rounds. Roll dies
for marking flats.

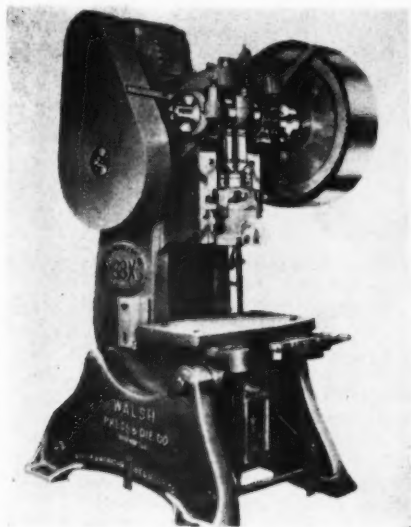
Write for more complete information on
these and other ACROMARK number-
ing and marking machines.

THE ACROMARK CO.

15 MORRELL ST. • ELIZABETH 4, NEW JERSEY

Walsh 38X press

Walsh Press & Die Co., Dept. BB, 4709 W. Kinzie St., Chicago 44, Ill., has designed the 38X punch press as a tryout press with greater accuracy than a screw press it is claimed. When a screw press is used to try out dies, almost any material will work successfully as the



press speed may be only one or two strokes per minute. The same material used on expensive dies in a punch press, at approximately 100 strokes per minute, quite often will not flow properly and will tear. The Walsh 38X press was also designed as a production unit for large or small production runs.

Westcott chuck features 2 1/4"-8 threaded hub for direct mounting

A new addition to the line of lathe chucks made by Westcott Chuck Co., Dept. BB, Oneida, New York, is the No. 5909 8" 4-jaw independent chuck, threaded 2 1/4"-8 for direct mounting on lathes, milling machines, grinders, and other machine tools with 2 1/4"-8 spindles.

No adapter is required and the chuck is therefore mounted right up close to the spindle bearing. This close mounting

SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

IMMEDIATE DELIVERY FROM STOCK



FOR ATLAS • LOGAN • SOUTH BEND CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE DRAWBAR 1/2" cap.



Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.

Let us quote on your quantity orders for any type of collet, live center or other machine tool attachment!

HAND DRAWBAR 1/2" cap.

LIVE CENTER (Ball Bearing) Double sealed for accuracy.

KASSON
Precision

KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them . . . Write us for literature!

GENERAL DIE AND STAMPING CO.

Integrity Since 1919

264 MOTT STREET • NEW YORK 12, N. Y.

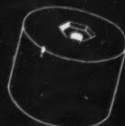
HEADING DIES

Solid Carbide Die Sections



small

and other specialties in the hardest metal



known since 1935



CARBIDE

TOOLS, DIES, POWDER

MOLDS, DIE-SINKING,

"NEW PROCESS" PROFILING

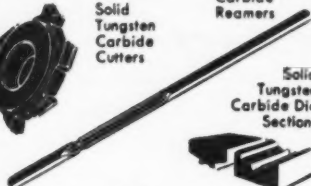
AND OTHER WORK INVOLVING—

"precision in carbides."



Solid Tungsten Carbide Cutters

Solid Tungsten Carbide Reamers



Solid Tungsten Carbide Die Sections



Number Insert of Solid Tungsten Carbide



Carbide Tipped Form Cutters

Many years of specialization in carbide and steel precision tools and die making has resulted in equipment and craftsmanship of rare distinction.

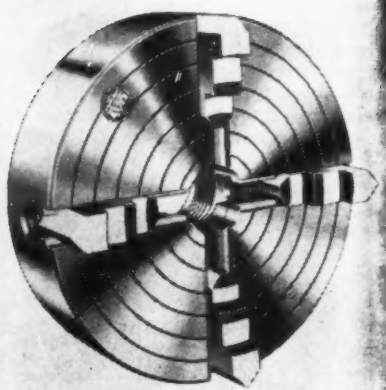
When you have a cutting tool problem or wish to consider tungsten carbide for a special application get a recommendation and quotation from B-M-S.

"Precision in Carbides and Steel."



B-M-S CARBIDE SPECIALTIES, INC.

1000 North Main St., Baenton, N. J. Baenton 8-0071



minimizes chatter that might be caused by excessive overhang.

Body is semi-steel. Jaws are steel, heat-treated and ground. Screws are alloy steel, heat-treated. They are threaded their full length except where necked for bearing. Thrust bearings are steel, heat-treated and fitted tightly into chuck body. Operating wrench included with each chuck. Net weight of chuck, 19 lbs.; body thickness, $2\frac{1}{8}$ "; center hole diameter, 1-9/16".

Lever control for variable speed motors

To maintain automatic speed regulation of mechanisms such as air cylinders, follower rolls and conveyors which have a movement proportional to the



desired speed range, a unique lever control has been developed for U. S. Varidrive motors, made by U. S. Electrical Motors Inc., Dept. BB, Box 2058, Los Angeles 54, Calif. The driven equipment can be mechanically linked to the lever. Maximum and minimum speeds may be pre-set by means of adjustable speed stops located on the exterior. The lever may be assembled by the user in any of four radial positions spaced 90° part. Full range of speed is achieved with only a 60° arc of the lever.

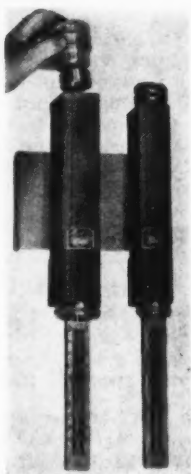
Built-in control valve, Flo-meter

Waukee Eng. Co., Dept. BB, Milwaukee, Wis., manufacturer of flo-meters for measuring flow rates of industrial gases and air, announce a built-in-control-valve version of the standard Waukee Flo-meter.

Built-in-valve models are available in 11 different sizes. Valves are located at top of meter for easy and quick reading. This feature makes installation of meter simple as there is no need to drill special holes for control valve when equipment is to be panel mounted.

The manufacturer states that the meters are easy to read because oil contained in the glass tube prevents the accumulation of dirt and other foreign matter which obscure the reading. Cleaning of meters is easy, and can be completed in less than two minutes inasmuch as unit has but one moving part.

Meters are available for measuring air, ammonia, butane, carrier gas, city gas, dissociated ammonia, endothermic gas, exothermic cracked (rich), exothermic cracked (lean), hydrogen, natu-



**RELTOOL
"BRITE"**



Beauty TO LOOK AT ... BEAUTY IN Performance

Hollow-ground and bright all over, Reltool End Mills are not only the best looking end mills you ever saw . . . they're proven in performance and cutting efficiency. In addition, they're designed for easy chip flow and 10% to 35% longer cutting life. Next time you need End Mills, re-tool with Reltool!

The RELTOOL Line Includes: Combined Drill and Countersinks • Cut-off Blades • Die Sinking Cutters • Dovetail Cutters • End Mills • End Mill Holders • Hollow Mills • Key Seat Cutters • Lathe Centers • Lathe Mandrels • Machine Countersinks • Metal Slitting Saws • Milling Cutters — all types • Screw Slotters • Tool Bits • Specials.

Write for Reltool's net price catalog 53.

Reltool CORPORATION
RELIABLE METAL CUTTING TOOLS

4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

A 7531-1/2



**SELLEW (Standard Adjustable Drill Heads) will greatly increase your DRILLING OUTPUT
In stock for immediate delivery**

No. 0-S (2 spin) min adj. $\frac{3}{4}$ " max adj. 2.3"—drill cap $\frac{1}{4}$ "
 No. 0-AD (3 spin) min adj. .65" max adj. 3.4"—drill cap $\frac{1}{8}$ "
 No. 0-D (3 spin) min adj. $\frac{3}{4}$ " max adj. 4.6"—drill cap $\frac{1}{4}$ "
 No. 1-D (3 spin) min adj. 1.16 max adj. 6.33 spin. No. 1 M. taper
 No. 2-D (3 spin) min adj. 1.4 max adj. 8" spin No. 2 M. taper
 No. 3-D (3 spin) min adj. 2.5" max adj. 13" spin No. 3 M. taper
 Fixed spin. heads built to order.

Send us your drilling requirements

**SELLEW MACHINE TOOL COMPANY (Inc. 1910)
PAWTUCKET, R. I.**

ral gas, oxygen, propane and purging gas.

New type radial play gage

A new type of radial play gage that uses a Sheffield "Plunjet" gaging cart-ridge and a column-type air gage for measuring radial play in ball and roller bearings is announced by The Sheffield Corp., Dept. BB, Dayton 1, Ohio. This application of air gaging permits highly accurate measurement of radial play at higher amplification than is possible with dial indicators.

Two standard models are available, one for bearings with an outer diameter ranging from 18mm to and including 90mm, and the other will accommodate an outer diameter from 90mm to and including 180mm. The measuring loads of both models are adjustable to the standards of the Anti-Friction Bearing Manufacturers Association, Inc., Revision No. 1, April 1952.

Features include an automatic shake-down of the balls into the bottom of the groove; direct readings without use of

FOR UNEXPECTED PROFITS in Your Shop

ask yourself these questions:

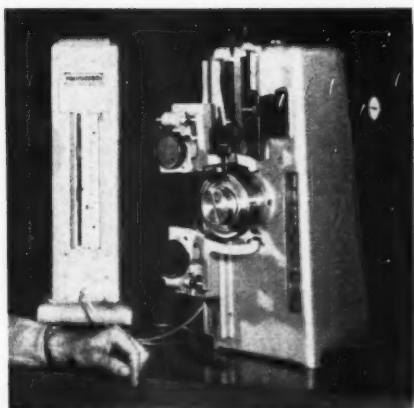
- Could you increase productivity and profits by fast rearrangement of machines to meet new production needs, with "down time" all but eliminated?
- Could you benefit by speed in leveling certain types of machines?
- In precision machining operations, such as grinding, do you ever find that rejects are traceable to vibration?
- Would you like to forget about lagging machines to the floor to keep them from walking?
- Would your worker productivity increase if you could reduce plant noise?

... then let us do something about the answers.



Write TODAY for your free copy of "LOOK—NO LAGGING!" to The Barry Corporation, 784 Pleasant Street, Watertown 72, Mass.

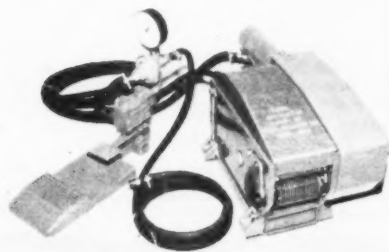
The NEW Leveling Barrymount can make profits for you out of problems you may have thought couldn't be solved. It represents a wholly new idea in mounting machinery. What it can mean to you in immediate profits is described in this new bulletin.



masters; a single three-station foot pedal control of load bearing arms; easily changed arbors that correspond to the internal diameter of a bearing's inner ring; and Sheffield's "Guidegage" feature on each arbor to facilitate slipping the bearing on the arbor.

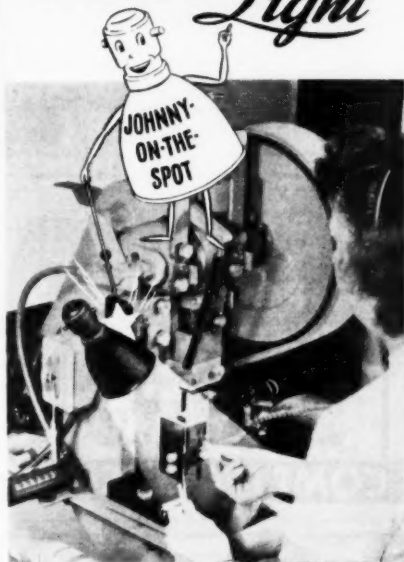
Air-operated tape dispenser

An air-automatic pressure sensitive tape dispenser, Grip-A-Tab, is being introduced by Derby Sealers, Inc., Dept.



BB, Derby, Conn. The air-operation principle is said by the company to increase taping output on production lines and to require less effort. Foot-lever operation reduces dispensing time and predetermined lengths eliminate tape waste. Air valve can be regulated to control dispensing power for the varying requirements of different tapes.

VIMCO *Light*



JOHNNY-ON-THE-SPOT MAKES YOUR MACHINE "LIGHT INDEPENDENT"

Machine Builders: No matter where your machine is installed, Vimcolights will protect its efficiency . . . help maintain its top performance.

When operators see better . . . they work better. Vimco lights make your machine independent of eye-straining glares, shadows and dark spots. Vimcolights help eliminate the unknown variable of worker fatigue that decreases the efficiency of any machine no matter how well designed.

Write for NEW Bulletin No. 85

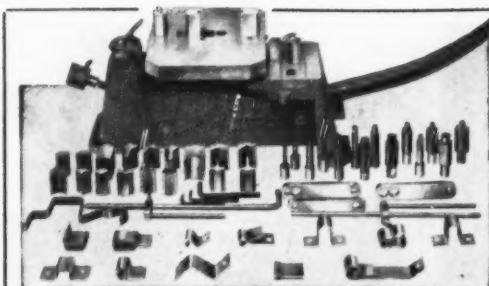
**SEE BETTER . . .
WORK BETTER**

VIMCO MFG. CO., Inc.

SINCE 1919

109 Brayton Street

Buffalo 13, N. Y.



Multiform BENDER-CUTTER

CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to $\frac{3}{4}$ " x $1\frac{1}{2}$ " as illustrated, other models up to $\frac{1}{4}$ " x 4".

J. A. RICHARDS CO.
KALAMAZOO, MICH.

HIGH SPEED or CARBIDE BORING TOOLS

FOR HOLES FROM
 $1/16$ " UPWARD
17 DIFFERENT SIZES

Write For Complete Data

COMET Tool Co.

For MASS PRODUCTION

- FAST PERFORMANCE
- ECONOMY IN PRODUCTION
- EFFICIENT IN RESULTS
- CONSTANT SHAPE OF CROSS SECTION
- LONG LIFE

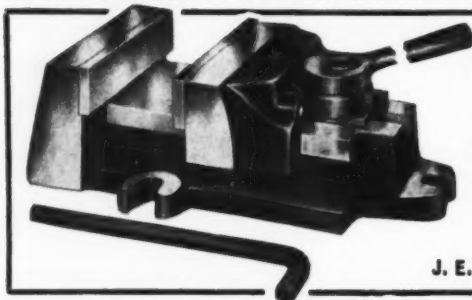


Dealers! Here's
a Profit-Maker!



738-MT Broadway

New York 3, N. Y.



Plunket Quick Action Vise for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws $5/16$ ".

Size No. 7 Net Price

6" jaws, $1\frac{1}{2}$ " deep, opens 4".....\$83.16

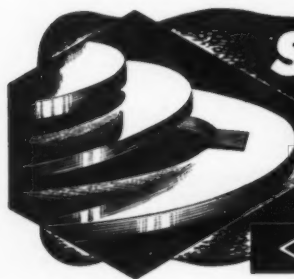
Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co.

3230-32 Archer Ave.
Chicago 8, Ill.



Specify



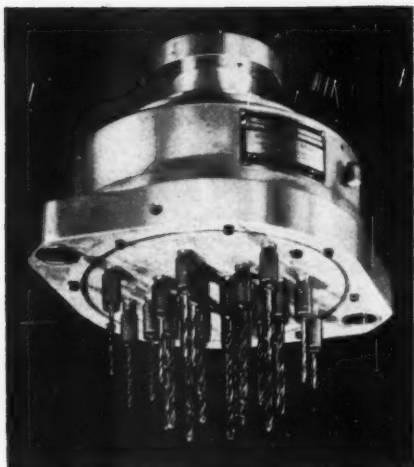
**Arbor Spacers
and Shims**

For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters $\frac{3}{4}$ " to 4" 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.



DETROIT STAMPING COMPANY

347 MIDLAND AVENUE • DETROIT 3, MICHIGAN



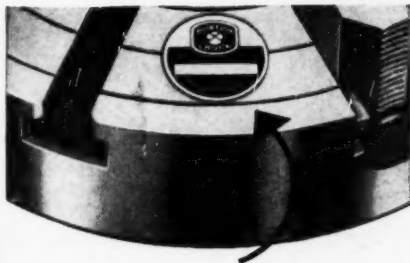
Zagar gearless drillhead, 12", 24-spindle; capacity up to 5/8" steel.

CHOOSE *Zagar*
GEARLESS DRILLHEADS
to Drill on All Centers

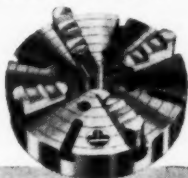
They (1) can drill practically any number of holes at one pass, up to 600 or more; (2) can drill any material; (3) can drill in any pattern; (4) can "come down to" distances between holes as small as twice the drill diameter; (5) can and do maintain accurate spacing. Zagar gearless drill heads can be furnished as complete units or can be adapted to any standard drill press. Your parts drawings and full data will bring you a prompt quotation.

Write for Engineering Manual "B-11"

ZAGAR TOOL, Inc., 24000 Lakeland Blvd.
Cleveland 23, O.



this name
 is your guarantee
 of dependable
 performance
 . . . backed by
 102 years
 experience in
 the manufacture
 of the world's
 finest chucks.



See your Distributor for a complete line of chucks by
 Horton — pioneer in J-Type chucks for jet engine machining.



DIVISION OF
THE E. HORTON & SON CO.
 WINDSOR LOCKS, CONN.

WALTHAM CYLINDRICAL SUB-PRESSES

Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.



ARCH SUB-PRESS

WALTHAM MACHINE WORKS WALTHAM 54, MASS.

Standardize on hall COLLET CHUCKS

for
SPEED,
ACCURACY,
ECONOMY



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. A-11

HALL MANUFACTURING COMPANY

622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

HAND TAPPING with MACHINE PRECISION

Adapts for
LATHE
USE

59⁵⁰

F. O. B.
FACTORY



Just slip a tap adapter into the Dahlstrom Tap Guide and twist. Your hand tapping will be quick and accurate. For machine tapping, the spindle top is center-bored to fit the tailstock center of a lathe. Size 13" x 8" x 14". Includes 9 adapters (8-32 to 3/4"). Taps not furnished. Branch Mfg. Co., North Branch, Minn.

WRITE FOR PAMPHLET.

Dahlstrom TAP GUIDE

NO MORE COSTLY JIGS

on small production jobs with

Troyke Worm Wheel Operated Tables



Size:

9 - 12 - 15 - 18 - 21 - 25

See your dealer or write
for Catalog No. 17.

Fully illustrated showing all models and applications to various work.

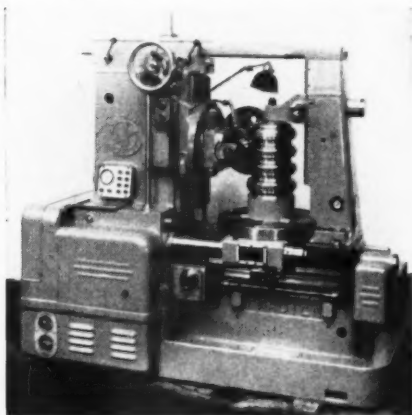
TROYKE MFG. CO., Cincinnati 9, Ohio, U.S.A.



Drilling attachments can now be furnished for Worm Wheel Operated Tables.

German gear hobber

A complete line of precision gear hobbers for spur-, worm-, helical-gears and spline shafts is distributed by Transmares Corp., Dept. BB, 15 William Street, New York 5, N. Y., as factory representative for original Pfauter, Ludwigsburg, West Germany. Gear



hobbers up to 60" diameter and pitches up to 1½ d.p. are available. Special Index drive is standard and permits readjustment for backlash without altering center distance. Additional features are: hydraulic climb hobbing arrangement, automatic feed, automatic work cycle control, and tangential cross feed.

Rodgers introduces triple duty open yoke press

Rodgers Hydraulic, Inc., Dept. BB, 7450 Walker St., St. Louis Park, Minneapolis 16, Minn., recently introduced a new open yoke press said to perform the work of three separate presses. The press incorporates all of the features of standard shop presses; it can handle practically every job done on regular forcing presses and, because of a fully machined yoke bed can be used as a regular platen press, the manufacturer claims.

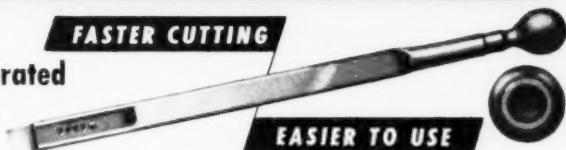
Open yoke presses are available in 100, 200, 300 and 400 ton capacities. Rugged, machined "V" blocks are accurately centered in the yoke member groove. A wear collar is supplied for inserting

NEW IMPROVED HAND SCRAPERS

with just the correct spring

and other features
never before incorporated
in any hand scraper

FASTER CUTTING



EASIER TO USE

This new Hand Scraper, Model No. 5, is the most improved tool of its kind ever produced. Light in weight, easier to use with palm fitting comfort grip, faster cutting.

Rubber handle swivel pad, at small

extra cost, for those who place scraper handle against body for extra leverage. Three sizes: 18"—20"—22" long. Furnished with high speed steel or Carbide Blades. Cost less than home made scrapers.



Write for Bulletin No. 9-5

ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

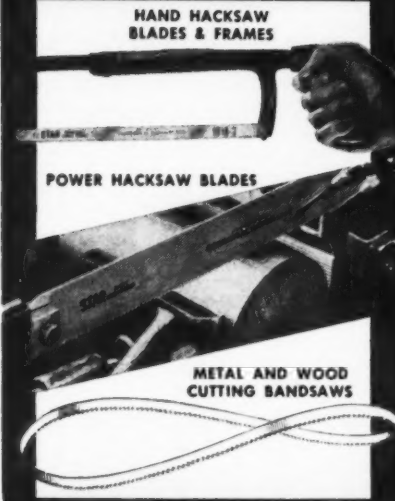
your **STAR** distributor
has whatever you **NEED**
in your

**METAL CUTTING
OPERATIONS**

HAND HACKSAW
BLADES & FRAMES

POWER HACKSAW BLADES

METAL AND WOOD
CUTTING SANDSAWS




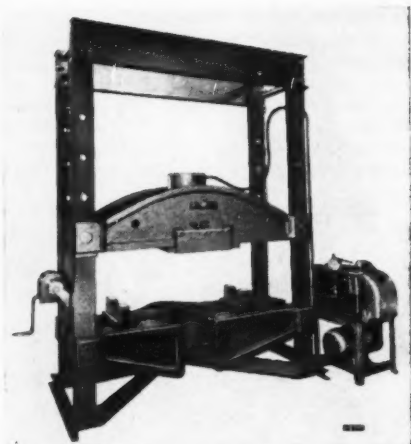
Back of every Star Blade are 75 years of metal cutting experience. When you ask for Star, you get a product made of the finest steels available. You get a product made on specially designed equipment which assures uniformity, shipment after shipment.

Your nearby Industrial Distributor is the man to call for Star Metal Cutting Blades. He is your logical source of supply not only for Star Blades, but for all the industrial supplies you need regularly and quickly to keep your production running on schedule.



Sold Only Through Recognized Distributors

CLEMONS BROS., Inc.
MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hacksaw Blades,
Frames, Metal and Wood Cutting Band
Saw Blades and Clemson Lawn Machines.

in yoke recess as well as a bed plate insert to cover recess and provide a continuous flat working surface. The yoke recess takes yoke adapters regularly used with Rodgers forcing presses.

Line burner by Eclipse

A new product now in production by the Eclipse Fuel Eng. Co., Dept. BB, Rockford, Ill., is a gas-fired retention-type line burner for applications where heat must be distributed over a wide area by a continuous flame; i.e., oven heating, kettle heating and air heating installations, including make-up air systems for spray booths.

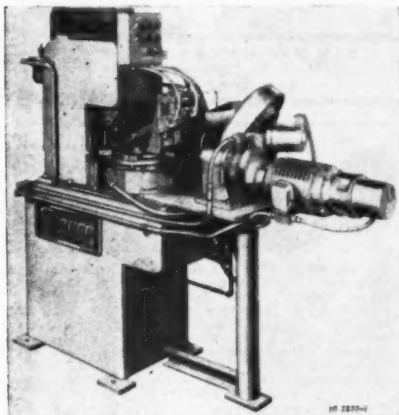
Of the blast burner design, burners may be installed to fire in any direc-



tion: horizontally, vertically or downward. They are made of cast iron sections with drilled ports and steel retention lips for flame stability. Each section is equipped with drilled and matched flanges, so they can be bolted together for a variety of continuous flame patterns.

Automatic drilling, assembling and crimping machine

The manufacture of a specially designed automatic drilling, assembling, and crimping machine has been announced by Turner Bros., Inc., Dept. BB, 2625 Hilton Road, Ferndale, Mich. The machine has been engineered



and constructed for the automatic hopper loading of breather nut, insertion of baffle, crimping of baffle, drilling of nut and automatic ejection. It was stated that the machine has been designed to economize on floor space in addition to saving on manpower.

Lodge knives

Said to be rugged enough for the machinist's tool box or fine enough for dress, knives imported by the Abbeon



Supply Co., Dept. BB, 179-51 Jamaica Ave., Jamaica 32, N.Y., from Solingen, Germany, can be secured with the emblem of either the Masons, Shriners, Elks or Knights of Columbus on them.

These are 3 1/4" long by 3/4" wide. Casing is gun metal black and the raised insignia nickel plated.

767 STANDARD SIZES OF MARSHALL STEEL PRECISION GROUND FLAT STOCK

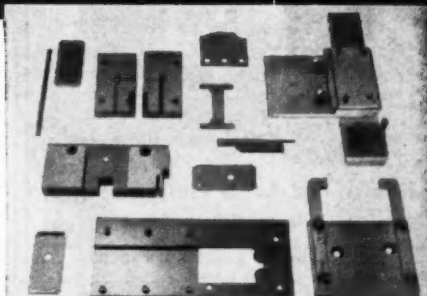
The world's largest range of sizes of precision ground tool steel in three grades are available, ready for immediate shipment and the layout bench.

WATERcrat: A fine grained electric furnace high carbon tool steel. It has been wet ground to remove all bad surfaces and to assure velvet finish of virgin metal.

OILcrat: An outstanding product of careful handling assures you of a fine grained electric furnace oil hardening ground flat stock ready for the layout bench.

AIRcrat: This air-hardening tool steel shows less size change and offers a greater safety in hardening than either of the other grades. Box 108-B

Write for descriptive literature, catalog of sizes and prices.



MARSHALL STEEL CO.
LA GRANGE, ILLINOIS

The Aristocrats of Ground Tool Steel

which of these



materials
do you
engrave?

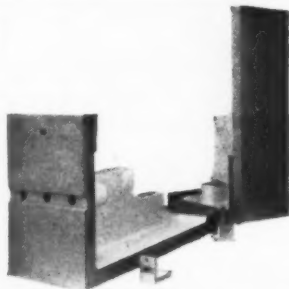
.....
STEEL
BRASS, COPPER, NICKEL-
SILVER, DIE CAST METAL,
PLASTIC, WOOD, ETC.

The PREIS-PANTO Model UE-3
Engraver will engrave lettering
or design on all of these ma-
terials. Built to do the work
of larger machines this en-
graver gives greater pro-
duction speed and ease of
handling on the part of the
operator.

Write for new Bulletin
B-1 and ask for Catalog
UE-3 with price lists.

PANTO

H. P. Preis Engraving Machine Co.
647 State H'Way 22 Hillside, N. J.



Surface and Angle Plates any size,
Straight Edges, Box - Steel - Tool
Steel Parallels, Lapping Plates.

TATRA TOOL CO.
16317 Sanford Ave. Cleveland 10, O.

If you fail to get reply via U.S. Mail
"Wire us at once" or write care of

THE HITCHCOCK PUBLISHING CO.
222 E. Willow Street Wheaton, Ill.

F
R
E
E
T
R
I
A
L

Vi-Speed



FAST
RUGGED
•
HOLDING
PRESSING
PUNCHING
•
SIMPLE
DESIGN
•
8 MODELS
•
Guaranteed
•
WRITE FOR
CATALOG

VAN PRODUCTS CO.
3734-48 W. 12th Street
Erie, Penna.

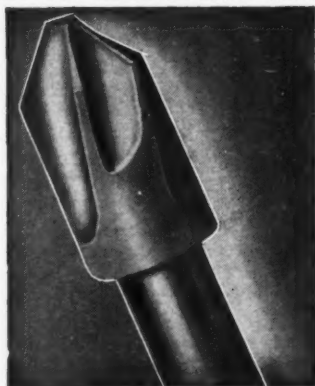


The simplified PYRO Optical is the ideal instru-
ment for direct temperature readings of ANY
heated object in your plant. Completely SELF-
CONTAINED. PORTABLE. RUGGED. LIGHT
WEIGHT (3½ lbs.) and FOOLPROOF. No cor-
rection charts, no accessories and no maintenance
expenses. Unique design permits temperature de-
termination even on MINUTE SPOTS. Fast MOV-
ING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 80

THE PYROMETER INSTRUMENT CO.
New Plant and Laboratory, Bergenfield 3, N. J.

SOLD THRU LEADING SUPPLY HOUSES



**GROBET CHATTERLESS
COUNTERSINKS**

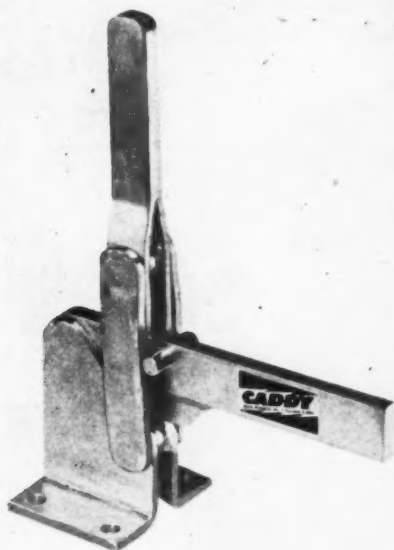
Six staggered cutting edges give shearing cut
that eliminates all chatter.

SEND FOR CATALOG C-CI.

GROBET FILE CO. of AMERICA, INC.
421 Canal Street New York 13, N. Y.

Toggle clamps

Cadmium plated toggle clamps in three models are announced by Erico Products, Inc., Dept. BB, 2070 E. 61st



Place, Cleveland 3, Ohio. Features are said to be extra large pivot pins, heavier links and handle, all welded construction, reinforced clamp bar and heavier frame. Model V-3—weight 5½ lbs., pressure rating 2000 lbs.; Model V-2—2000 lbs. pressure rating, weight 3 lbs.; Model V-1—pressure rating 1000 lbs.

1½" cylinder handles 300 p.s.i.

Magicair Div. of Pneumatic Products, Inc., Dept. BB, Hamden, Conn., have announced the addition of a 1½" cylinder, which features a threaded nose on either end, named the Studmount model. It is said to be good for 300 p.s.i. hydraulic or pneumatic service. As its name implies, the cylinder may be mounted in stud form without the use of mounting brackets, jigs, or fixtures. The manufacturer claims its compact size, unhampered by tie rods and

SAVE



with

AIR-O-Chek

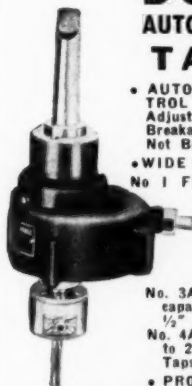
The valve with the Internal Fulcrumed Lever

- **Save** on Initial Cost.
- **Save** on Maintenance
- **Save** Compressed Air
- **Save** Compressor Wear

Write for Full Details

AIR-WAY PUMP & EQUIPMENT CO.
1054 N. Kilbourn Ave. Chicago 51, Ill.

DORMAN AUTOMATIC REVERSE TAPPERS



- **AUTOMATIC TORQUE CONTROL** . . . One Minute to Adjust . . . Prevents Tap Breakage . . . Operator Need Not Be Skilled

- **WIDE RANGE TAP CAPACITY**
No. 1 **FRICITION DRIVE TAP-**

PER
—capacity No. 2-56 to ¾" in Steel
½" in Aluminum.
No. 2B **POSITIVE TAPPER**—capacity ¾" to 7/8" in Steel

No. 3A **POSITIVE TAPPER**—capacity ½" to 1½" in Steel.
½" to ¾" Pipe Taps.

No. 4A **TAPPER**—Capacity ¾" to 2" in Steel including Pipe Taps.

- **PRODUCTION THREADERS** with Round Split . . . Button . . . Acorn Dies

- **IMMEDIATE DELIVERY**

Price from \$48.00 Write for Bulletin.

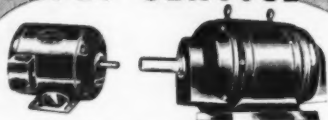
THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

GRAINGER'S SUPPLY SERVICE



USE NEARBY GRAINGER STOCK

Next time you need motors and other electrical items—save time and money—order from your Grainger Motor Book. You'll get fast shipping and pick-up service from your nearby Grainger Warehouse—and lowest possible prices always.

**DEALER
CATALOG**

Request on Letterhead
ADDRESS DEPT. MT-1



W. W. GRAINGER, INC.

46 WAREHOUSES—COAST TO COAST—SEE PHONE BOOK
GENERAL OFFICE 118 S. OAKLEY BLVD. CHICAGO 12

WHO*

makes the finest in
**CAP SCREWS • SET SCREWS
COUPLING BOLTS
MILLED STUDS**



*Wm.
H.
Ottomiller Co.
YORK, PENNA.

threaded heads on both ends, as the outstanding feature of this new cylinder. The interchangeability of these heads makes it possible to furnish this cylinder in "double ended rod" models. All materials are reputed to be corrosion- and rust-free.

Roller bearing slide racks

The addition of roller bearing slides to patented Stackracks allows even the heaviest boxes or bins to slide as easily as drawers in a file, according to the manufacturer, Stackbin Corp., Dept. BB, 1085 Main St., Pawtucket, R.I.

Like all Stackracks, the new slide racks lock together, without tools, to



form storage units of any size, shape or capacity. Tote boxes or Stackbins can be stored in Stackracks like drawers, keeping small parts and materials always accessible.

Stops prevent the roller bearing slides from being pulled out more than halfway, so that loaded boxes cannot fall or spill contents, but still permit easy access and removal.

Vard ball jack precision built

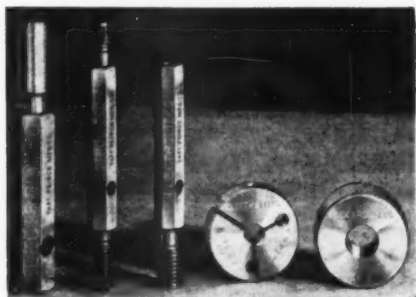
Engineers of Vard Inc., Dept. BB, Pasadena, Calif., have developed a new line of ball screwjacks. Utilizing physical principles of screw expansion and



the near-frictionless spacer ball, coupled with tolerances up to .0004 in the ball bearing races, these screwjacks are said to maintain a constant ratio of characteristics, with higher average efficiency. They are made up with a mating nut and screw, each having helical ball races, precision ground to highly accurate tolerances. The ball circuit is closed with a return tube which is attached to the nut. This allows the ball bearings to circulate freely, resulting in the transmission of rotary motion to linear motion with a minimum of loss due to friction.

Electrolized gages tough

The Taft-Peirce Mfg. Co., Dept. BB, Woonsocket, R.I., announces a new addition to its gage line, electrolized gages. The manufacturer claims that tests have proved that Taft-Pierce electrolized gages last many times longer



The LINLEY JIG BORER

**Put your small jig
boring jobs on this
precision machine**

Here's a machine, available at extremely low cost, that will enable you to save your larger machines for larger, heavier work. You'll find it meets your most exacting requirements for precision. Get our accuracy information and you'll see what an outstanding investment this machine represents.

Table movement: 6"x10";
table size, 7"x17 1/2".

Send TODAY for
complete information.

LINLEY BROTHERS COMPANY

663 State St. Ext., Bridgeport 1, Conn.



**Now—
"JOB-
INDEXED"
marking
devices**

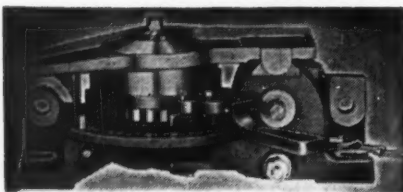
Ever notice how difficult it is—
in the average catalog—to find
EXACTLY the right kind of hand
or machine marking device?

New Method's *new* catalog classifies them by the jobs they do...
in easy-to-find fashion.

Get your copy. Ask for Catalog No. NM-51.

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

MODEL H . . . AUTOMATIC CHUCKING and INDEXING FIXTURE



1. 1800 light cuts per hour.
2. Either horizontal or vertical position.
3. Collets changed instantly.
4. Automatically knocks piece out.
5. Ratchet or degree indexing—degree indexing added later if desired. Capacity 1".
6. Automatic indexer also added later. Model F—Both degree & ratchet indexing. Capacity up to 2 1/4".

Write for Folders.

J. W. DEARBORN, Ansonia, Conn.

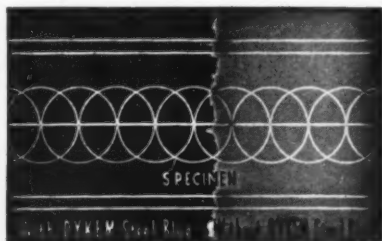
than ordinary hardened steel gages. This longer life is due to the even film of hard, non-magnetic alloy which is applied to all gaging surfaces during the electrolyzing process. This coating is only .000025" thick, but it imparts a tough surface much harder than tool steel, resulting in long accurate gaging life before an electrolyzed gage reaches wear tolerance limits. The gaging surface will not chip, peel, or spall under normal gaging conditions.

Lightweight, powerful rod cutter

A specially-adapted shear is one of the fastest, easiest, and most accurate means known for cutting steel rods of various kinds and sizes. Whitney Metal Tool Co., Dept. BB, Rockford, Ill., now makes the tool shown in the picture, their new No. 400 rod cutter, for this purpose. It consists of a movable shear blade and fixed shearing die, both easily replaceable. The blade is moved by a geared 48" lever, giving tremendous power and producing a quick, smooth



cut. Capacity of the tool is any type of mild steel rods from 1/8" to 3/4" diameter.



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the lay out in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

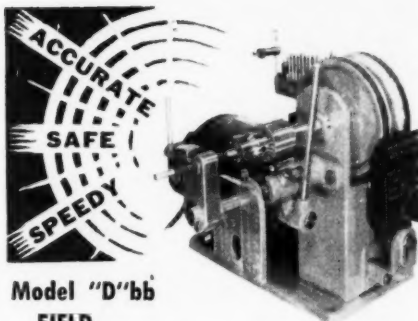
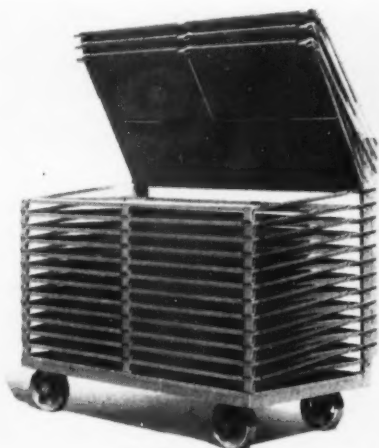
THE DYKEM COMPANY

2301G North 11th St.

St. Louis 6, Mo.

Book rack

This book rack is being manufactured by Palmer-Shile Co., Dept. BB, 16063 Fullerton, Detroit 27, Mich., designers and manufacturers of a long line of materials handling equipment. Made for



Model "D"bb
**FIELD
SENSITHREADER**

From tapping to threading the operator quickly swings the tap work plate to one side, removes the tap, inserts the precision die holder in the Jacobs chuck and swings the Rod chuck into position. The slide stops are set and controlled length rod threading can be done as well as controlled depth tapping. Chamfering, countersinking, deburring and with the Spindle stop, reaming, spot facing, etc. are easily accomplished on the Model "D"bb SENSITHREADER.

Circular on Request.

HERB M. FIELD
417 N. Monroe St. Portland 12, Oregon

Dependable MEASURING & CHECKING EQUIPMENT and Now HAND WHEELS, KNOBS, HANDLES

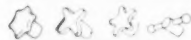
Cadmium Plated

Non-rusting — good looking

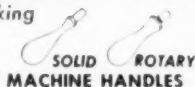
READY
TO
DELIVER



STRAIGHT and OFFSET TYPE



CAST IRON



**SOLID ROTARY
MACHINE HANDLES**



MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.



BOX PARALLELS

In 13 sizes, ranging from 3 x 4 x 12 and up.

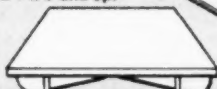
SLOTTED ANGLES

In 19 sizes, ranging from 4 x 9 x 5 and up.



UNIVERSAL ANGLES

In 10 sizes, ranging from 4 x 3 1/4 x 5 and up.



SURFACE PLATES

Over 50 sizes, ranging from 7 x 7 1/2 to 96 x 192.

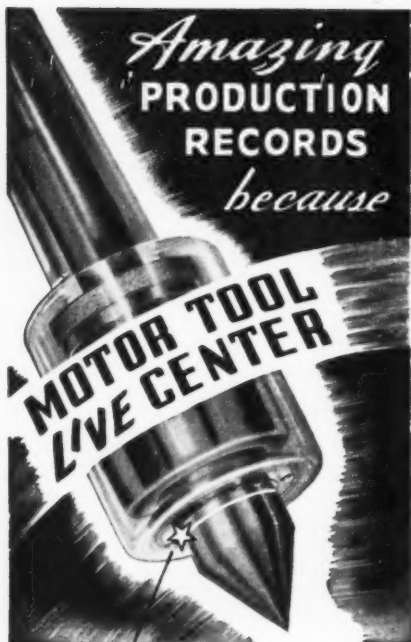
Send for Complete Catalog

MACHINE PRODUCTS CORPORATION

6771 E. McNichols Rd.

Dept. A

Detroit 12, Mich.



is the ONLY Center
with the
**OVERLOAD
INDICATOR**

Look for the RED BAND

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

Send for

NEW descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

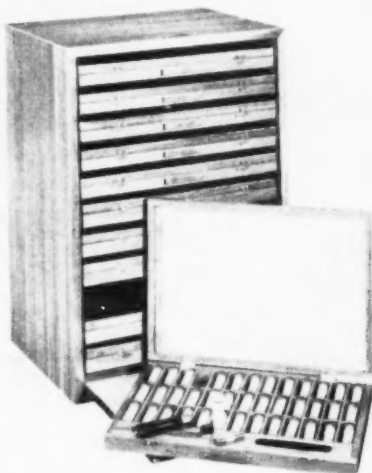
MOTOR TOOL MFG. CO.
P.O. BOX 3805 PARK GROVE STATION DETROIT 5, MICH.

*Motor Tool Rule
is Call Motor Tool*

use by manufacturers for drying or curing sheets or material, or where parts must be separate; shelves can be raised or lowered easily and are automatically held in position by sturdy extension springs. The shelves are made to specifications with specified distance between each shelf and are constructed to carry weight required. Each truck has number of shelves needed. Can be made for handling with lift truck or wheeled by hand. Equipped with either metal or rubber tired wheels.

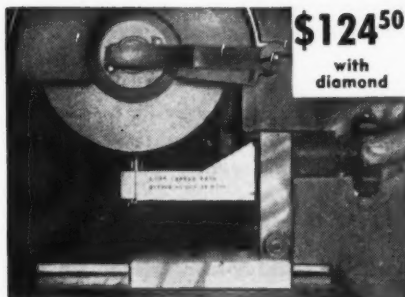
**Cabinets for all size
control gage sets**

The Size Control Co., Dept. BB, 2500 W. Washington Blvd., Chicago 12, Ill., now has two new style, mahogany cabinets available into which any of their gage sets will fit. Space is provided in



each cabinet for separate collets to fit a universal handle for each plug member in class XX, X, Y and Z accuracies.

There are reversible plain sets in number, fractional or letter sizes com-



\$124⁵⁰

with
diamond

SOMERSET RADIUS DRESSER

FOR SURFACE GRINDERS

Now you can cut production time without sacrificing accuracy. The new Somerset Radius Dresser is easy to set, easy to see and eliminates necessity of guard removal. "Tricky" jobs become routine operations when Somerset is employed. Write today for free fact-cramped folder and prices. No obligation.

DELIVERY FROM STOCK

SOMERSET TOOL CO.

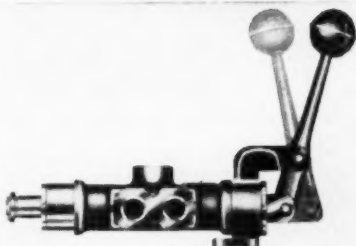
2200 VIRGINIA AVE.

HILLSIDE, N. J.

plete in cases—reversible thread sets in any combination of reversible standard thread sizes, national and unified series,—reversible special sets in any combination desired.

Air control valve

Valvair Corp., Dept. BB, Akron, Ohio, has augmented its line of air control valves by adding a new air control valve which has two speed controls built into the valve body. The principal



OVER 1500 NOW IN USE!

ABA Precision Surface Grinder

WITH HYDRAULIC TABLE FEED
AND ADDITIONAL HAND FEED

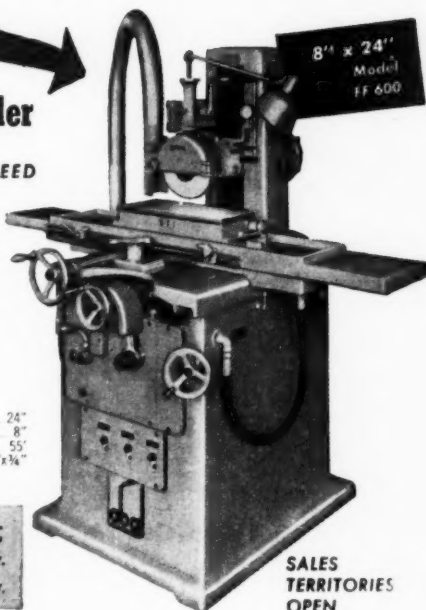
Where highest precision is required the ABA Precision Surface Grinder meets every test. With the aid of divided heads, sine plates, and other attachments it can handle the heaviest and most difficult jobs. Complete hydraulic table feed as well as manual operation make this grinder doubly practical. The use of ball bearings means extremely easy handling of all hand wheels and operating levers.

STOCK DELIVERY!

PARTIAL SPECIFICATIONS

Max. length of grinding area	24"
Max. width of grinding area	8"
Long. table speed, infinitely variable FPM	55'
Grinding wheel	8" x 3/4"

Write today for full specifications.



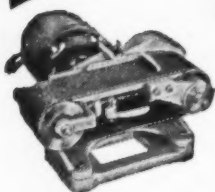
MOREY
for machine tools!

MOREY MACHINERY CO., INC.
Manufacturers • Merchants • Distributors

410 BROOME ST. • NEW YORK 13, N. Y.
TELEPHONE: CANAL 6-7400
CABLE ADDRESS: WOODWORK, N. Y.

**SALES
TERRITORIES
OPEN**

**DOES IT BETTER
DOES IT FASTER**



**SIMPLEX-M
ABRASIVE BAND
GRINDER**

The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N.Y.

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/2
2D	5	5 1/2	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
1335 SO. MAIN STREET
MEADVILLE, PENNSYLVANIA

use is to control the stroke of an air cylinder. The advantages claimed for built-in speed controls are: (1) no purchase or installation of separate speed controls; (2) simpler piping than usually required with separate speed control units; (3) cost saving of over 50% effected by this design.

Rubber cushioned abrasive textures

A new series of rubber cushioned abrasives has been announced by Weldon Roberts Rubber Co., Dept. BB, Newark, N.J., in Standard, Tuff-tex and Fine-tex, available in three grades: 54BL, coarse; 70BL, medium; and 120BL, fine.



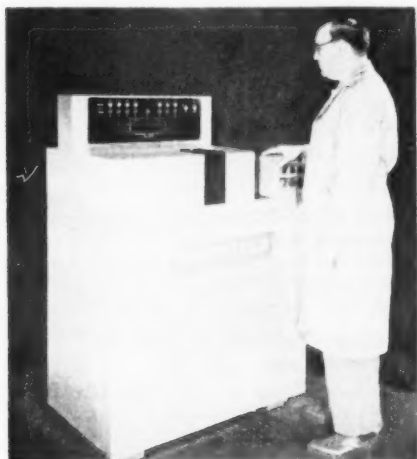
All Brightboy textures are made in a variety of sizes in wheel, discs, sticks, rods, cylinders, tablets and blocks for machine and manual use. They are said to work to close tolerances and can be shaped to contour. The series features a new rubber binder, carefully com-

pounded with abrasive grain, to achieve a tough rubber cushion for the evenly blended abrasive.

Automatic gaging of 30 cal. ammunition

A gaging machine for 30 calibre ammunition featuring small compact size, fully automatic inspection and segregation, and a single split-chamber gage station is manufactured by The Sheffield Corp., Dept. BB, Dayton 1, O.

This self-contained gage is only 40" long, 30" wide, and 57" high, saving a substantial amount of floor space in



installations that use more than one machine. It inspects 3600 units per hour. Each complete round is checked for profile and alignment, six dimensions, and weight. At the same time, the machine automatically segregates rounds into four classes: (1) acceptable (2) reject on dimensions (3) overweight, and (4) underweight.

Square D announces size 4 vertical action starter

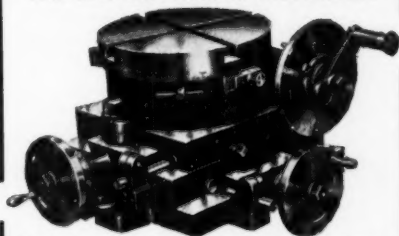
The Square D Co., Dept. BB, 4041 N. Richards St., Milwaukee 12, Wis., has a new NEMA Size 4 vertical action starter in production. With maximum polyphase ratings of 50-h.p., 220 volts, 100-h.p., 440-550 volts, the new starter is considerably smaller than the clapper type starter it replaces. Overall dimen-

The **STEVENS** Line

SINCE 1925

Showing 7½" Dial Type Rotary Table mounted on compound table No. 1

- Traverse and Circular Movements -



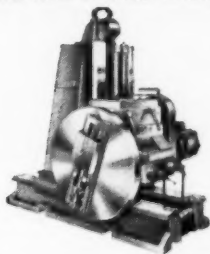
Made in larger size 12" dial type Rotary - compound table No. 2. Either unit usable separately. Five sizes of Rotary Tables. Adjustable tilting tables. Multiple spindle index centers. Screw head slotters. Vises.

Write for Bulletins

The **JOHN B. STEVENS Company**
SOMERSVILLE, CONN.

FORNEY

BORING AND FACING MACHINES

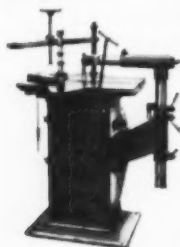


1st and **FINEST**

Machine features a spindle housing as motor power unit which moves directly into work face. Results in more accurate work, more power and rigidity in cutting tool. Facing head capacity to 66 inches. Weight of standard machine 15,000 pounds.

FORNEY'S INC.

Manufacturers of Special Machinery Since 1916
P. O. Box K, 310 New Castle, Pa.



S TRAIGHT OR
TAPER KEYWAYS
U NIVERSAL
CENTERING
N O BUSHINGS OR
BUSHING HOLDERS
REQUIRED
R UGGED STEEL
CONSTRUCTION
A TABLE TYPE FEED
Y OUR PRODUCTION
MACHINE

Faster and more economical cutting of keyways with SUNRAY. Meets your most exacting requirements. Keyways cut $\frac{1}{4}$ " to 1" by broach having several teeth cutting at once; also eliminates tendency of cutter to dig into the work. Many other advantages!

Write for further data, it's free

SUNRAY COMPANY
P.O. BOX 445 • SPARTANBURG, S. C

NOW ...an even Stronger **MICRO-MINIATURE** IN STUB LENGTH



When you think of small
END MILLS - think of
MICRO MINATURES

Save Small End
Mill Breakage

**PRECISION GROUND
FROM SOLID!**

- Faster Cutting
- Long Life
- Polished Flutes
- Strength

EASTERN DISTRIBUTORS

Karl A. Neise, 401-4th Ave., N.Y. 16, N.Y.

Material Sales Co., 14438 W. Warren Avenue, Dearborn 1, Michigan

Midland Engineering & Sup Co., 7516 W. Belmont Ave., Chicago 34, Ill

Write for Catalog

WOODSON TOOL CO.

4811 Lennox Blvd. Inglewood, Calif.

sions of the new open type starter are only $9\frac{1}{4}$ " wide, $14\frac{3}{4}$ " high, $7\frac{3}{8}$ " deep.

As many as eight electrical interlocks (4 normally open and 4 normally closed) may be added to the starter,



either at the factory or after shipment. Interlocks are mounted on their own insulating base and can be fastened to the starter with two screws without removing the starter from its enclosure.

Williams expands line of punches and chisels

J. H. Williams & Co., Dept. BB, Buffalo 7, N.Y., has broadened their line of punches and chisels with the addition of cape chisels, diamond point chisels, round nose chisels, extra long cold





MILWAUKEE SURFACE PLATES

THE KEYNOTE TO ACCURATE MEASUREMENT

Over forty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight edges are all made of the highest quality semi-steel and finished to exact dimensions.

WRITE TODAY FOR YOUR FREE CATALOG

J. C. BUSCH COMPANY

Engineers and Machinists Since 1907
165 S. BARCLAY ST. • MILWAUKEE 4, WIS.

Plain Type

Offset Type

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO Moulding & MFG. CO.

1110 E. 87TH ST.
CHICAGO 19, ILL.

SPECIFICATIONS:
Open width $\frac{7}{8}$ " to 6"
Gage Material .040 to .125
Pin Diameter .101 to $\frac{1}{8}$ "
Lengths to 120"

SUPERBORE



COUNTERBORES and drills...

IN STANDARD SIZES AND OVERSIZES
ABOVE STANDARD DIMENSIONS

▼ SUPERBORE Counterbores provide that shade of difference when counter-boring operations require oversizes from standard dimension holes. Precision grinding inside of flutes and pilots after heat treating, allow chips to flow out freely. The flutes are backed off to width of land to prevent heat generation, clogging or freezing. Each set is serial numbered. No. 500 consists of ten standard dimensions, counterbores and drills. No. 400 is $\frac{1}{64}$ " oversize and No. 300 is $\frac{1}{32}$ " oversize above standard dimensions. ORDER YOURS TODAY! Write for Literature and Prices Box 429-B

TWENTIETH CENTURY MANUFACTURING CO.

Libertyville, Illinois



IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG., CO. • URBANA, OHIO

chisels and pinch bars. This complete assortment is now available in a full range of sizes.

Forged from high grade octagon alloy steel, these tools are properly hardened and tempered to stand up under severe service.

Bushing driver for driving threaded inserts

The Titan Tool Co., Dept. BB, Main Street, Fairview (Erie County) Pa., manufacturer of Titan stud drivers and pullers, recently announced a new bushing driver for driving threaded inserts for aircraft and general industrial applications.

Unique design features of this new production tool provide automatic positioning of threaded inserts to the proper depth below the face of the casting. A ball bearing pressure plate prevents backing the insert out after driving. The standard Titan bushing drivers are equipped with $\frac{1}{2}$ " female square drive to drive threaded inserts .010" below face of the casting and are manufac-

tured in sizes for all threaded inserts commonly in use.

Drawing lubricants

A new series of drawing lubricants designed for light press work where speed, ease of application, and ease of removal are prime factors, has been developed by the Van Straaten Chemical Co., Dept. BB, 546 W. Washington St., Chicago, Ill. One compound of the new series is a pigmented, extreme pressure, paste type product which is said to give a superior finish, eliminate scratches and metal pick-up. Another is non-pigmented, is an extreme pressure type for lighter draws or those operations where metal pick-up is not a problem. They were originally designed for drawing or forming stainless and high alloy steels but also work well with carbon steels.

New line of fans, grinders

The Baldor Electric Co., Dept. BB, 4353 Duncan Ave., St. Louis 10, Mo., announces development of a complete new line of portable fans, 16", 20" and 24" sizes. Also it announces improve-

BIG JUMP FORWARD *in Boring and Facing!*

Our
Model "D"



**All Models Have
POWER FEED
for Facing**

**• A Boring Head
that Won't Face
is Not Complete**

**Six
Sizes
Available**



RE-DESIGNED

Many New Features

Write Today for Complete Details

CHANDLER TOOL COMPANY, MUNCIE, INDIANA

COMBINED BORING &

FACING TOOL HEADS

Chandler-Duplex

MICRO-HEIGHT GAUGE . . .



FOR FAST, ACCURATE LAYOUT

A new precision height gauge which reads like a micrometer and measures zero flush at base. Has a direct reading of 2" with scriber in upright position, and 3" with scriber reversed.

Replace scriber with dial indicator and Micro-Height Gauge measures center distances between holes or surfaces. As indispensable as a micrometer to toolmakers, layout men, and inspectors.

write for circular and prices

FAIRFIELD GAUGE COMPANY

168 HERBERT STREET
BRIDGEPORT 6, CONNECTICUT

NEW Hi Speed

CUT-OFF and GRINDING WHEELS



Unbreakable Elastic Longer Lasting even at highest speeds. Strong construction enables use on machines running at surface speed of up to 20,000 ft. per minute. Can be used universally for cutting and grinding of all factory materials including hard and soft metals. Stand-off sizes and grits. Cut-off wheels up to 20 dia. grinding wheels 7 and 9 dia. with depressed center.

Variable High Speed CUTTING OFF MACHINE

Modern, accident-proof construction. Equipped with special drive gear to permit continuous speed regulation. Motor and gear mechanism enclosed in sturdily constructed cabinet. High capacity. Suitable for cutting practically every material smooth and clean. With sizes 10 to 20. High speed wheels.

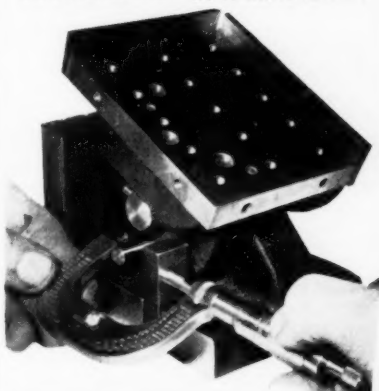
WRITE FOR DESCRIPTIVE LITERATURE
DEALER INQUIRIES INVITED



CROWN ABRASIVE CO., INC.
1841 Broadway, New York, N. Y.

PRECISION
MADE

BEMISINE ANGLES TO A MINUTE IN A MINUTE . . .



DRILLING — MILLING — JIG BORING
GRINDING — INSPECTION

Write for Bulletin

Mutual Machine Co., Hudson, Mass.

Look to SID TOOL CO. for DIAMOND TOOLS and NIBS



**SMALL
LANDIS**
7/16" x 1"
7/16" Head



**SMALL
NORTON**
7/16" x 1"



CINTIL
Centerless
7/16" x 1 1/2"
3/8" Head

Brazed by a special formula and guaranteed to stay firm in the holders. "Will last a lifetime."

Dress your wheels accurately with long lasting Diamonds. Specify holder or nib required. No extra charge. Diamonds reset; 24 hour service, \$1.75.

CARAT	PRICE COMPLETE
1/4	\$3.95
1/2	7.50
3/4	12.00
1	14.40
1 1/2	21.60
2	30.00
3	35.00

HAND TOOLS 7/16" x 6"

**SID TOOL
COMPANY, INC.**
CUTTING TOOL
SPECIALISTS

126 LAFAYETTE ST.
NEW YORK 13, N. Y.
BEckman 3-4270

ments in its line of window fans, such as removable screen, wider range of adjustment, carrying handle, and recessed switch buttons. Features of their 600 series, de luxe grinder, according to the manufacturer, are wide clearance between wheels and motor frame, eye-shields supplied as standard equipment, and carrying handle.

Deburring machine works inside castings

Designed to deburr, grind and polish the inside and outside surfaces with equal ease, this power-belt grinder is offered in bench and portable models. It is made by United Machine Tool Co., Dept. BB, 1908 Clyde Park Ave., S.W., Grand Rapids, Mich.

All models are equipped with automatic belt tension, sealed bearing idler pulley and platen backing on one side for flat surface work and unbacked

belt on opposite side for contour polishing.

Bench models are available with 110 v motors—1/3 h.p. single horizontal arm, and 1/2 h.p. single horizontal arm, double horizontal arm, double vertical



DOWEL PINS

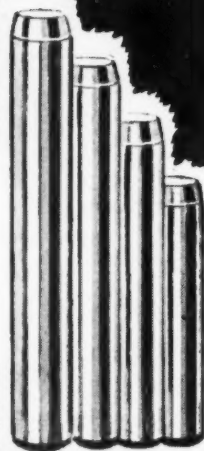
*Immediate
Delivery!*

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002" and .001" over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

Dealer inquiries invited.

SCHULTZ & ANDERSON CO.

111 EDISON PLACE, NEWARK 5, N.J.



arm, or vertical and horizontal arm adjustable clockwise to 12 operating positions. All bench models use 42" x 1" belts with commercially available abrasives. Will work in holes 1 $\frac{3}{4}$ " or over.

The Portable Hand Grinder Attachment is furnished with 1.150" standard mounting hole (or varied to suit) to fit popular makes of hand grinders. Belts are 12" x 1" available in wide choice of abrasives.



T-NUTS

WIDE RANGE
OF 16 SIZES

$\frac{3}{8}$ " to $1\frac{1}{8}$ "

For table slots and cross slides on machine tools, cyanide hardened. Write for catalog on full line of tool and shop accessories.

TIETZMANN TOOL CORP.

315 N. Main St. • Englewood, Ohio



ALL FE GAGES are

Made by skilled workmen from highest quality material. Constant size and continued accuracy are assured by sub-zero treatment. Each gage rigidly inspected.

Emergency situations in your plant solved by our unusually prompt delivery.



**THE FARMINGTON
ENGINEERING CO.**

595 New Park Ave. West Hartford 10, Conn.
Phone: Hartford 32-7095

We specialize in
large size ring gages

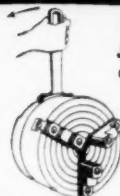
Write for 8-page descriptive catalog

Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



Top
Jaws
open



Hand lever
closes and locks
while lathe is
running.

Jaws locked



CHUCK DIVISION

THOMAS HOIST CO.

24 S. HOYNE

CHICAGO 12, ILL.

MOJAVE

PRECISION
GRANITE

SURFACE PLATES



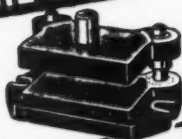
Precision surface. Made from finest California black granite. The finest surface plates available. Sizes: 18"x24": \$120, 24"x36": \$240. FOB Los Angeles. Other sizes quoted on request. Accuracy .0001. Write today.

MOJAVE GRANITE CO.

1651 Miller Ave. Los Angeles 63, Calif.
Since 1915

DANNEMAN *Precision* DIE-SETS

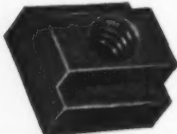
Precision-Bored
on Master Plates



DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG
ON REQUEST

SEND FOR FREE CATALOG TODAY



T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS

QUARTER TURN SCREWS

SHOULDER SCREWS
DOUBLE END JIG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
CUT THREAD STUDS
TEE-NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KURLED HEAD SCREWS

Northwestern

118 HOLLIER AVE., DAYTON 3, OHIO

PRECISION TOOLMAKERS VISE



1 1/4" Jaw \$18.40

1 3/4" Jaw \$28.20

Precision ground square and parallel to .0004/in. non-cumulative. Ground dovetailed slide. Hardened and ground jaws. Dustproof enclosed screw. Ample clamping grooves. Excellent for jig-boring, precision grinding, inspection. 10 day money-back GUARANTEE.

Dealer Inquiries Invited

AIR TRANSPORT EQUIPMENT, INC.
Old Country Road Mineola, N. Y.



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature

WATTS BROS. TOOL WORKS

Wilmerding, Pa.

READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.

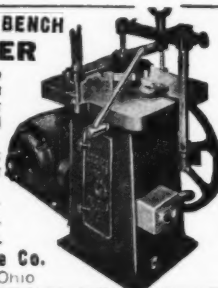
3 3/4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

Reading Machine Co.

Cincinnati 37, Ohio



CAMS

Made to your specifications

LET US HANDLE YOUR
CAM PROBLEMS

BLOOMFIELD TOOL CORP.

36 FARRAND ST. BLOOMFIELD, N.J.

SCHERR MAGNI-RAY

The Illuminated
MAGNIFIER for
PRECISION INSPECTION

Oblique rays make scratches and defects stand out clearly.

Genuine optical glass lenses.

Heavy adjustable base.

Removable lens housing for inspection of large surfaces, engines, etc.

WRITE FOR ILLUSTRATED FOLDER

GEORGE SCHERR CO., Inc.

200-MT LAFAYETTE STREET • N. Y. 12, N. Y.



Installation of duplicating attachment made within ten minutes

Copy-Master, manufactured by D. C. Caufield Co., Div., Copy-Master Mfg. Co., Columbia, Conn., is a duplicating attachment for lathes from 6" to 14" capacity. The device is said to be unique because installation can be made within ten minutes without alterations to the lathe itself.

Copy-Master with tracing finger is mounted to the compound by one bolt and travels automatically toward the headstock, which permits tracing finger to follow the shape of the stationary template, thereby maintaining constant control of the cutting tool at all times.

Slide is mounted in pre-loaded ball bearings, which permits a smooth in and



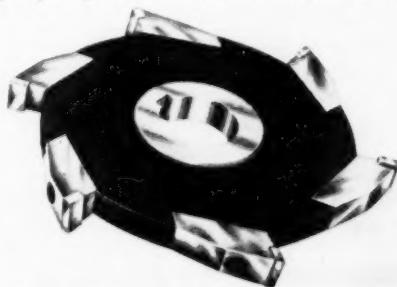
out movement of the cutting tool as dictated by contour of template, which is held in a fixed position by brackets bolted to the lathe bed.

Attached blade milling cutter

Complimenting the common solid body and inserted blade type cutters now on the market a new "attached blade" type has been introduced by Millet, Inc., Dept. BB, 55 Flint St., Rochester 8, N. Y.

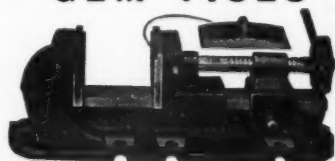
A primary advantage claimed for the Millit attached blade design is its complete blade rigidity. It combines the advantages of the solid body and inserted tooth type cutters by providing a replaceable blade with maximum tooth rigidity or minimum tooth deflection. This rigidity is obtained by seating the replaceable blade on the

periphery of the cutter body against



a body abutment that takes all cutting forces.

GEM VISES



Made in a range of sizes and types, to handle most any kind of machining operation, where vises are applicable. Write for circular, etc.

J. E. Martin Mach. Works, Springfield, O.

NEW NESTING TYPE

TOTE PANS



Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

DRILL STOP FOR PRECISION HOLE DEPTH CONTROL



Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

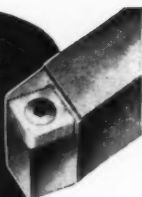
Write for Free Folder
with Illustrations
and Prices

EXCLUSIVE DISTRIBUTORS WANTED
WOHLNIP ENGINEERING COMPANY
390 Hillside Ave. Hillside, New Jersey



KENNAMETAL CUTTING TOOLS

for Increased
Productivity



KENNAMETAL Inc LATROBE, PA
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS

DO YOU WANT
EXTRA
ORDERS?

ADS

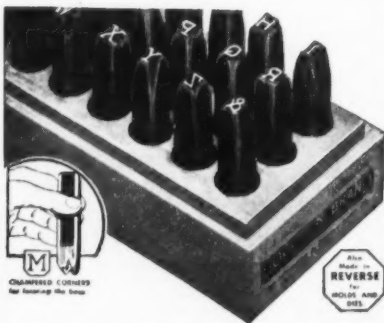
by **MARVIC**

ARE CREATED TO SELL YOUR PRODUCT or SERVICE

861 Manhattan Ave. Brooklyn 22, N.Y.

HOGGSON BRAND
Since 1849

HAND - CUT STEEL STAMPS AT MILL SUPPLY HOUSES



THE HOGGSON & PETTIS MFG. CO.
141H Brewery St., New Haven 7, Conn.

EASY-CUTTING EKSTROM, CARLSON



SPIRAL-FLUTE ROUTER BITS

STRAIGHT OR INVERTED-TAPER SHANKS
SINGLE OR DOUBLE FLUTE
SINGLE OR DOUBLE END
UP-CUT OR DOWN-CUT SPIRAL
FULL LINE OF STRAIGHT-FLUTE ROUTER BITS

Write for Literature

EKSTROM, CARLSON & CO.
1400 BAILEY AVE., DEPT. M - ROCKFORD, ILL.

MANUFACTURERS OF AIRCRAFT PRODUCTION MACHINERY

SAVE UP TO 85%

STAND MAGNIFIER
Handy stand magnifier with universal adjustments. Overall height: 6". Has powerful clear magnifying lens. **149**

MAGNETIC BASE-INDICATOR HOLDER...
A time saver for precision checking. Magnetic base fits curved or flat surface. Has 45-50 lb. pull. Stainless steel 3/16" rod mounted in ball socket permits universal settings... **3.95**
Note: We have complete line of instruments, depth gauges, inspection mirrors, etc. WRITE TODAY

GEAR HEAD MOTORS
Heavy duty, G.E. Gear Head motor. 2 HP, 24V. DC, 125 amp., reversible motor drives a reduction gear unit giving 36 to 1 ratio at take-off. Also will operate on 6 or 12 volts. **10.95 ea.**

ELECTRIC ACTUATORS
Hundreds of uses for any mechanical device needing controlled 2 way action. Opens, closes, raises or lowers doors - windows - gates - valves. **CTU-2 - Foote Linear Actuator** - 24 volt, DC, 8500 RPM, 1/6 HP - series wound motor, 4 1/2" stroke in 1 1/2 sec. Compression and tension loads up to 750 lbs. Adjustable micro switch for limits of travel. Overall length, retracted 11" **7.95**
We also carry many more sizes and types of Actuators. Write today for information.

230 Pg. CATALOG
Annealing Valves! 1000's of items for Mfg., Mechanic, Sportsman, etc. Save on Machine Tools, Hydraulics, Pumps, Valves, Hand & Power Tools, Instruments, etc. Send for your copy today!

NEW INSIDE - OUTSIDE VERNIER CALIPERS
German made by one of Europe's leading specialists in precision tools. Measures inside-outside & depth in .001" to 6" in 1000ths and 1/10mm to 150mm in 10ths. MICROMETERS - 0" to 1" in 1,000ths. Has lock-nut & ratchet... ONLY... **9.75**

BENDIX HYDRAULIC PUMP & MOTOR
Has 3-1/2 GPM capacity of 600 PSI. Motor is 1 1/2 HP, 24V, D.C. Will operate on either 12 or 32V. DC current. Has built-in relief valve adj. to 1500 PSI. This unit ideal for hyd. lifts, portable loaders, etc. **19.50**

HYDRAULIC HAND PUMP
Operating pressure 2000 PSI. Cap., 1.5 cu. in per complete cycle... **12.75**

HYDRAULIC ACCUMULATORS
A-28 FLOATING PISTON TYPE - 4" x 18" Built to stand 2,800 P.S.I. **12.75**
A-5 VICKERS - 10" dia. Ball type. Built to stand 2000 P.S.I. **24.75**

HYDRAULIC CYLINDERS
Gives 20,000 lb. thrust (push or pull) using 1500 PSI line pressure as obtained from our hydraulic pumps. Will produce up to 40,000 lb. thrust with 3000 PSI. Can also be used on low pressure air systems. 4" bore, 18" stroke; 30 1/2" length. Ideal for road form - shop machinery. **29.95**

No. 3 HYDRAULIC CYLINDER
Double action. Bore is 1" - Stroke 3/4". Has stroke of 2 1/2" to 4". Stroke can be adjusted with internal sleeve stops. Overall length is 8 1/2". Will take 1500 lbs. continuous duty, 3000 lbs. intermittent. Will lift or push up to 1100 lbs. We stock over 50,000 Hydraulic Cylinders, Valves, Pumps, Accumulators, Hand Pumps, Motors, Hoists, etc. All at Money Saving Prices. **5.75**

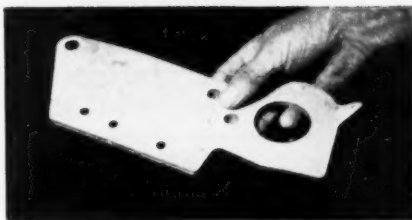
PALLEY SUPPLY CO. 2263 E. VERNON AVE. Dept. MTB-11 LOS ANGELES 58, CALIF.

Accurate die-cut parts

The Dayton Rogers Mfg. Co., Dept. BB, Minneapolis 7, Minn., announces a new improved method of producing precision die-cut parts with a high degree of accuracy.

Under this new improved method, the size and relative location of pierced holes is now being held to a tolerance of $\pm .001$ ", it is claimed.

This process lends itself to the die-producing of all sheet materials that can be stamped, such as all sheet and alloy steel, non-ferrous sheet materials, including fiber, bakelite and other sheet



stock. Practically any gage can be blanked and pierced to the desired shape and size, from .001" material up to and including 3/4" thick.

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. **Rates: \$12 per column inch per insertion. Maximum size advertisement accepted in this section is two inches.**

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK A Hitchcock Publication Wheaton, ILL.

IMPORTED PRECISION TOOLS

Vernier Calipers up to 80" - Height gages up to 48" at savings up to 40% to the user and excellent proposition for dealers.

RADIAL DRILLS & VERTICAL MILLS

Territories Open

We Carry the Tools in Stock.

Box 203

c/o MACHINE and TOOL BLUE BOOK

Wheaton, Ill.

DIAMOND POWDER

ALL MESH and MICRON SIZES

Purified and Graded to
U. S. Government Standards

Salvage service on diamond-bearing
Sludges, Wheels, Lapping Cotton.

Write for free literature

INDUSTRIAL DIAMOND POWDERS, INC.

Phone EDison 5-7541

P. O. Box 613 • New Kensington, Pa.

DROP FORGINGS

To Your Specifications
Prompt Quotations

BALDT ANCHOR CHAIN & FORGE DIVISION

P. O. Box 350 Chester, Pennsylvania

WANTED

Experienced New Machinery Salesman
to work and live in Kansas City area.
Old established concern. For details,

Write Box 201

c/o BLUE BOOK Wheaton, Ill.

All replies kept in strict confidence.



GEARED HEAD RADIAL DRILL PRESSES LOW COST VERTICAL MILLING MACHINES

Full Line of Vernier Calipers and Height Gages

Splendid Opportunity for Dealers

Masters 3613 ARCHER CHICAGO 9, ILL.

WANTED A Distinctive Product

Our client, an established New England manufacturer, wants to add one or more products selling through same channels as present line; will be interested in:

1. Small machine tools, such as milling machines or tool grinders.
2. Accessories for machine tools, such as drill attachments, drill heads, dividing heads or adjustable angle plates

Market acceptance established, sales potential \$500,000 a year and up.

Please write referring to advertisement No. 55. Brokers protected.

We are compensated by our client.

WELLING & WOODARD, INC.
52 Vanderbilt Ave. New York 17, N.Y.
CONSULTANTS IN DIVERSIFICATION
AND NEW PRODUCTS

ACETATE SHEETS

UP TO 1/4" THICK
Sheet sizes
20" x 50"

*Ideal for Machine Guards
Windows
Safety Shields
Blue Print
Covers*

INDUSTRIAL PRODUCTS SUPPLIERS
201 S. Dean St., Englewood, N. J.

Non-metallic oil additive rust inhibitor

A new rust inhibiting oil additive believed to offer more complete protection of ferrous surfaces than has been possible heretofore with other non-metallic inhibitors is available in commercial quantities from Atlas Powder Co., Dept. BB, Industrial Chemical, Wilmington, Del. Immediate indicated uses include the protection of stored aircraft engines (both piston and jet), diesel and gasoline engines, turbines, pipe lines, and ferrous tools or components in production stages.

Identified as Atpet 100, the new inhibitor is a sorbitan mono fatty acid ester akin to the company's widely used Span 80 which is used in many military specifications. In performance and economy, however, the new material under many conditions shows substantial improvement over Span 80.

EXPERTS



AT STAMPINGS

IN
SMALL LOTS
SHORT RUNS

Die costs about 15% of conventional tooling. If you need 100 or 10,000 stampings—

Mail us your prints.

DAYTON ROGERS
Manufacturing Company
MINNEAPOLIS 7, MINN.



SURPLUS SALE

NEW TOOL POST GRINDERS

REGULAR PRICE \$125.00

\$39.50

Less Grinding wheel
1/6 H.P. MOTOR

Takes Wheels up to 1/2" x 4"
Extra Quill Ext. or Internal \$19.50
Money Back Guarantee

EDWARD J. NOLAN

PULASKI, NEW YORK

In internal combustion engines particularly, this material provides freedom from pre-ignition and other undesirable effects of ashy residue encountered with sulfonic inhibitors containing the salts of such metals as sodium, calcium or barium.

Mechanics Through the Ages

TO MINIMIZE THE BREATHING IN OF DUST — AND TO MAKE
TOOL SHARPENING EASIER — *BRITISH MACHINE SHOPS*

OF THE MID-1800's PROVIDED
 INCLINED PLANES LEADING
 FROM FLOOR TO THE TOPS
 OF THE GRINDSTONES SO THAT
 THE WORKMEN COULD
 LAY FLAT ON THEIR
 STOMACHS WHILE
 GRINDING, WITH THEIR
 HEADS ABOVE THE
 STONES —



IN HOLLAND,

IT TOOK MANY GUILDS
 TO TURN OUT ARMS AND
 ARMOR FOR WARRIORS
 OF THE MID 1500's.

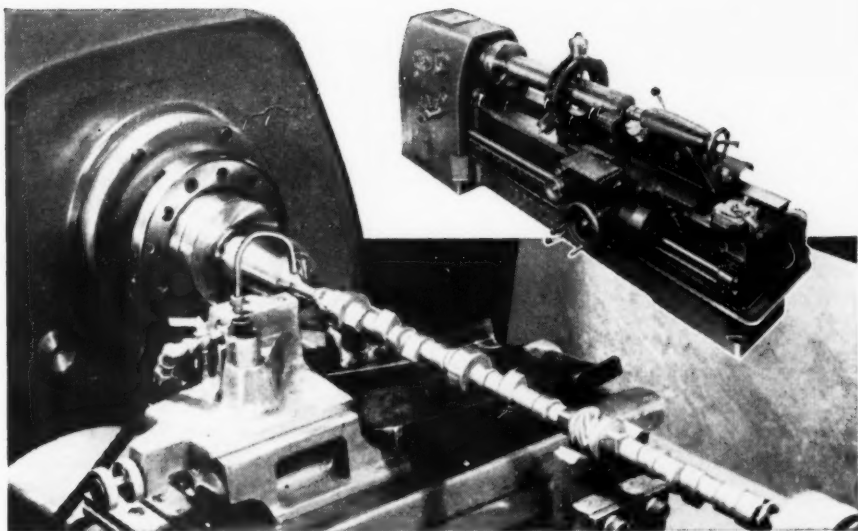
THERE WERE SEPARATE
 GUILDS FOR THE MAKING
 OF PLAIN-ARMOR, CHAIN-
 ARMOR, HELMETS, SWORDS,
 CUTLERY, GUN-BARRELS, GUNS
 AND PISTOLS



IN THE 1740's

MANY OF THE BLACKSMITH
 SHOPS OF BIRMINGHAM,
 ENGLAND, EMPLOYED WOMEN
 TO WORK AT THE ANVIL,
 POUNDING OUT NAILS





"Special" threads are just routine on the CRI-DAN "D"

QUICK FACTS

Materials—Steel Forging
Hardness—Brinell 262-293
Threads per inch—14
Thread Dia.— $\frac{3}{4}$ "
Thread length— $\frac{1}{2}$ "
No. of passes—8
Threading time—.66 min.
(90/hr.)

Threading this camshaft could have posed many problems such as: material too tough, tolerances too tight or an "impossible" delivery date.

But the Cri-Dan accepts such things as "everyday" occurrences and continues to amaze even the "Old Hands".

Fast threading and precision are just two of the many features of the Cri-Dan "D". A glance at the Quick Facts on this job will show, that if you have a difficult threading problem, it will pay you to contact your Lees-Bradner representative—or write direct to us.

the **LEES-BRADNER** [®]
CLEVELAND 11, OHIO, U. S. A. *Company*

Whatever You Need, You'll Find It Here

A

Abrasive Cloth, Paper, Disc, Belts, Wheels, Stones,
Etc., 24, 36, 70, 77, 86, 231, 292
Abrasive Cutting Machines, 24
Accumulators, 423
Actuators, 423
Adapters, 87, 134, 332
Air Control Equipment, 99, 140, 405
Air Gages, 2
Air Operated Equipment, 27, 325
Air Tools, 144, 179, 239
Angles, 409, 415, 417
Arbor Spacers, Shim Stock, 87, 359, 398
Arbors, 290

B

Backrests, Roller, 297
Balancing Machines, 101, 201, 334
Balancing Ways, 401
Bar Equipment, 269
Bar Feeds, 341
Bar Pointer, 391
Bars, 156
Bearings, Bronze, 292
Bearings, Sleeve, 202
Bending Equipment, 85, 126, 167, 224, 367, 373,
389, 398
Blasting Machines, 219
Blow Guns, 95, 384
Blocks, 269
Boosters, 80, 81
Boring Bars and Tools, 50, 174, 290
Boring Bits, 13
Boring Chucks, 288
Boring, Drilling & Tapping Machines, 208
Boring, Facing Machines, 370, 413
Boring, Facing Tools, 50
Boring Heads, 59, 358, 416
Boring Machines, 6, 11, 66, 67, 69, 84, 91, 94,
116, 147, 169, 179
Boring Tools, 295, 398
Brackets, 332
Brakes, Press and Bending, 36, 37, 167, 378
Broaches, 320, 321, 327
Broaching Machines, 8, 9, 10, 118, 320, 321
Brushes, Wire, 54
Buffing Machines, 222, 440
Bushings, 48, 49, 356, 371, 382, 392
Bushings, Rotary, 227, 359

C

Callipers, 206, 366, 423
Cams, 387, 420
Carbide Blanks, 422
Carbide Stock, 394, 421
Carbide Tools, 3, 13, 23, 32, 103, 128, 132, 174,
299, 331, 344, 345, 347, 370, 394, 421, 422
Center Mikes, 317
Centers, Live, 316, 322, 348, 356, 393, 410
Centers, Motorized, 91
Chamfering Tools, 226
Chucking and Indexing Fixtures, 408
Chucking Machines, 45
Chucks, 33, 87, 117, 174, 377, 399, 419
Chucks, Collet, 87, 400
Chucks, Segmental Grinding, 257
Chucks, Index, 325
Chucks, Lathe, 204
Chucks, Magnetic, 41, 96, 116, 204
Clamps, 4, 42, 324
Clamps, Jaw, 42
Clamps, Strap, 4
Clamps, Toggle, 335
Clamps, T-Slot, 4
Clutches, 341, 431
Coatings, Plastic, 53, 352
Collet Chucks, 325
Collets, 33, 117, 199, 393, Back cover
Comparators, Dial, 27, 52, 284
Comparators, Optical, 284
Coolant Systems, 301, 374
Coolants, 259
Copers, 367
Cotter Pins, 390
Counterbores, 163, 290, 415
Countersinks, 163, 395, 404
Cut-off Blades, 395
Cut-off Machines, 24, 417
Cut-off Wheels, 24, 417
Cutter Sharpening Machines, 8, 9
Cutters, 85, 92, 93, 347
Cutting Fluid and Oils, 8, 9, 12, 259, 287
Cutting Tools, 18, 19, 65, 290, 331, 330, 421, 422
Cylinders, Hydraulic and Pneumatic, 99, 181, 423

D

Deburring Machines and Tools, 226, 314
Demagnetizers, 294
Diamond Lapping Oil, 374

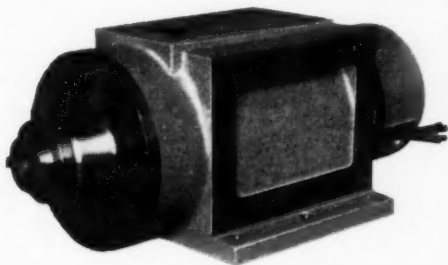
For High Speed Milling on Non-Ferrous Metals

Specify

POPE

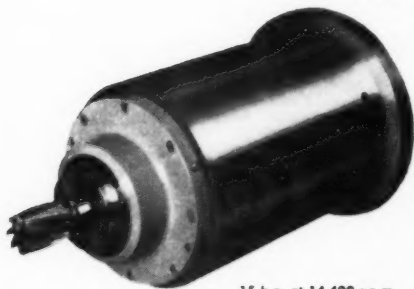
**HIGH FREQUENCY
HEAVY DUTY
PRECISION SPINDLES**

These Heavy Duty, High Speed Milling Spindles can be furnished in a wide variety of horsepowers and speeds, ranging from ½ h.p. to 100 h.p. and from 3600 r.p.m. to 60,000 r.p.m. They are unequalled for long life, trouble-free operation and rugged ability to cut metal fast.

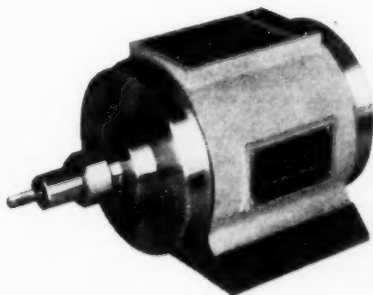


20 h.p. at 7200 r.p.m.
40 h.p. at 14,400 r.p.m.

These Spindles are arranged to operate in horizontal, vertical or angular position, whichever you specify.



15 h.p. at 14,400 r.p.m.



2 pole — 4 pole motor ¾ h.p. at 12000 r.p.m.
½ h.p. at 6000 r.p.m. 1 h.p. at 18000 r.p.m.
1½ h.p. at 36000 r.p.m.

POPE designs and builds special High Frequency Spindles for a great range of applications. For recommendations and quotations, let us have your specifications.

No. 97

Specify

POPE

PRECISION SPINDLES

POPE MACHINERY CORPORATION

201 RIVER STREET - NANTUCKET, MASSACHUSETTS

Diamond Tools, 417
Diamond Wheels, 184
Die Flippers, 91
Die Heads, 117
Die Holders, 297
Die Makers' Supplies, 25
Die Making Machines, 31
Die Sets, 25, 109, 420
Die Set Pullers, 40
Die Set Oilers, 40
Dies Progressive, 237
Dividing Heads, 204
Dovetail Cutters, 395
Dowel Pins, 418, Inside Rackover
Draw Bars, 393
Dressers, Tool, 411
Drill Guides, 339
Drill Heads, 111, 208, 307, 396, 399, 405
Drill Heads, Multiple Spindle, 405
Drilling and Tapping Machines, 41, 47, 405, 417
Drilling Machines, 30, 43, 85, 323, 370
Drilling Machines, Bench, 224
Drilling Machines, Multiple Spindle, 85, 160
Drilling Machines, Portable Electric, 234
Drilling Machines, Radial, 84, 120, 121, 136, 390
Drilling Machines, Upright, 82, 439
Drilling Units, Automatic, 310
Drills, 65, 76, 103, 415, 449
Drills, Hard Steel, 310
Drills, Step, 380
Drills, Twist, 18, 19
Duplicating Attachments, 62, 63
Dust Control, 211, 282, 372, 410
Dye, Layout, 384

E

End Finishers, 226
End Mills, 18, 19, 65, 128, 152, 275, 360, 395, 414
Engravers, 329, 364, 404
Etchers, 390
Extractors, Tap, 370

F

Fabricating Tools, 124
Face Mills, 347
Facing Heads, 391, 416
Facing Tools, 347
Feeders, Work, 72, 199, 243
Files, 71, 86, 255
Files, Rotary, 13, 92, 93
Filing Machines, 31, 366, 385
Filters, 83
Fixture Keys, 230, 420
Flame Hardening Machines, 8, 9
Flat Stock, Ground, 403
Flexible Shaft Equipment, 13, 92, 93, 142
Floats, 350
Furnaces, Heat Treating, 110, 232, 303

G

Gage Blocks, 32, 183
Gage Blocks, Carbide, 183
Gages, 59, 99, 169, 200, 284, 366, 382, 417, 419
Gages, Air, 244
Gages, Dial, 52, 59
Gages, Height, 417

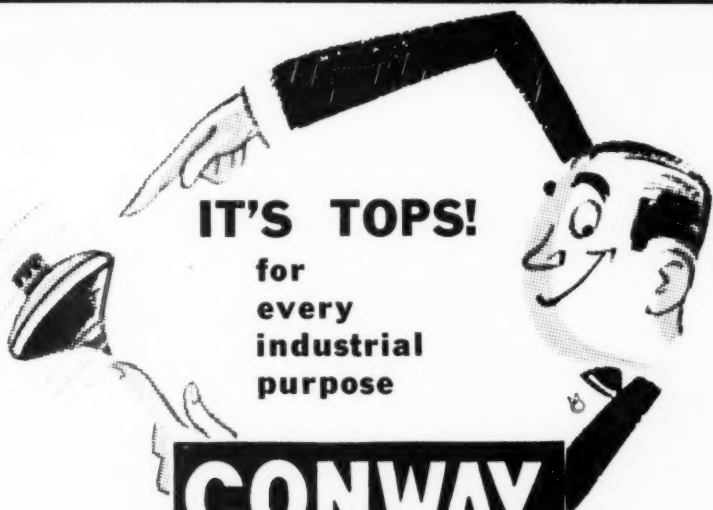
Gages, Internal, 169
Gages, Pin, 107
Gages, Plug, 32, 59
Gages, Thread, 145, 147, 169
Gear Hobbers, 253
Gear Laps, 253
Gear Measuring Equipment, 32
Gear Shapers, 253
Gears, 35, 234, 253
Grinder Heads, 257
Grinders, 31, 285, 300, 440
Grinders, Abrasive Belt, 3, 412
Grinders, Bench, 20
Grinders, Carbide Tool, 3, 20
Grinders, Chaser, Cut-off Wheel, 383
Grinders, Chip Breaker, 3
Grinders, Diamond Finishing, 3
Grinders, Disc, 222
Grinders, Drill, 31, 102, 192
Grinders, Face, 251
Grinders, Face Mill, 31
Grinders, Hand, 122
Grinders, Internal, 146, 147
Grinders, Jig, 91
Grinders, Knife, 251
Grinders, Portable, 127, 144, 170
Grinders, Precision, 84, 102, 122
Grinders, Profile, 8, 9, 22, 66
Grinders, Radial Relief, 57
Grinders, Surface, 75, 122, 182, 249, 251, 261, 411
Grinders, Template Tool, 31
Grinders, Tool & Cutter, 31, 43, 82, 122, 179, 225, 251, 279
Grinders, Universal, 16, 17
Grinders, Wheel, 3
Grinding Fixtures, 117, 318
Grinding Wheels, 75, 184, 228, 229, 417
Grooving Tools, 175

H

Hammers, Plastic, 375
Hammers, Rawhide, 112
Hand Knobs, 420
Hand Wheels, 409
Handles, Machine, 409
Heads, Drill, 396
Heads, Mill, 106
Hinges, 415
Hob Sharpeners, 172, 173
Hobbing Machines, 161, 172, 173
Hobs, 172, 173, 253
Hoists, 239
Holders, Back Rest, 297
Holders, Cut-off Blade, 297
Holders, Drill, Tap & Reamer, 297
Holders, Magnetic, 346, 423
Holders, Tap, 297
Holders, Tool, 79, 88, 90, 134, 297
Holders, Work, 90
Holders, Wheel, 77
Hole Location Accessories, 91
Honing Machines, 7, 370
Hopper Feeding Units, 241
Hose Assemblies, 83, 99

I

Index Fixtures and Tools, 298, 408
Index Tables, 1, 356, 400, 413
Indicators, Precision, 244
Inspection Units, 417, 420



IT'S TOPS!

for
every
industrial
purpose

Write for New
Bulletins

CONWAY CLUTCH

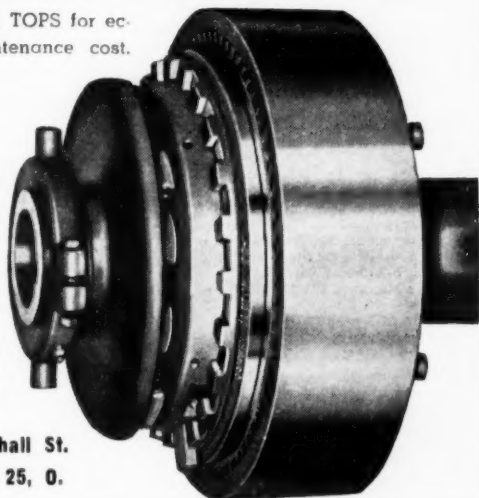
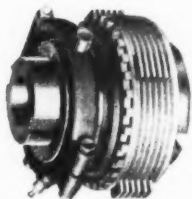
*"The Clutch
of Robust
Refinement"*

FROM "MIDGET" MODELS TO 300 HP HUSKIES

CONWAY CLUTCHES are rated TOPS for economy, performance and maintenance cost.

Precision-built of basic materials, with standardized interchangeable parts.

**THE CONWAY
CLUTCH CO.**



1105 Marshall St.
Cincinnati 25, O.

J

Jacks, 4
Jig Boring, 407, 417
Jig Boring Services, 417
Jig Feet, Double End and Screw Type, 420
Jig Feet, Screw and Press Type, 420
Jigs and Fixtures, 230

K

Keys, Machine, 390
Keys, Woodruff, 390
Keyseaters, 385, 414, 420
Keyway Cutting Equipment, 326, 395
Knobs, Machine, 409
Knurling Tools, 297

L

Lapping Machines, 46, 75, 271, 306
Latch Bolts, 420
Lathe Attachments, 62, 63, 236, 346
Lathes, 30, 66, 120, 121, 138, 139, 176, 179,
207, 236, 269, 312, 313, 346
Lathes, Automatic, 101, 201, 312, 313
Lathes, Bench, 43, 82
Lathes, Engine & Toolroom, 300, 312, 313, 312,
437
Lathes, Floor, 43, 82
Lathes, Hollow Spindle, 119
Lathes, Precision, 73, 240
Lathes, Speed, 304
Lathes, "T", 312, 313
Lathes, Tailstock, 236, 346
Lathes, Turret, 43, 66, 67, 82, 81, 101, 201, 269,
300, 349
Lathes, Vertical Turret, 349
Lifts, Hydraulic, 114, 115
Lighting Equipment, 392, 398, 397
Light Wave Equipment, 32
Locknuts, 26
Lubricants, 287, 293, 376
Lubricators, 83, 239

M

Machine Knobs, 420
Machine Tool Attachments, 129
Magnets, 38
Magnifiers, 289, 420, 423
Magnifiers, Binocular, 369
Magnetic Bases, 346
Mandrels, Expanding, 336
Mandrels, Lathe, 87
Marking Devices, Stamps, 305, 407
Marking Equipment, 34, 390, 392
Marking Machines, 34, 90, 364
Measuring, Checking Equipment, 469
Measuring Wires, 32
Metallizing, 125
Metal Forming Machines, 8, 9
Metal Plating, 125
Micrometers, 52, 206
Micrometers, Lightwave, 32
Micrometers, Pedestal, 366
Milling Cutters, 18, 19, 117, 132, 174, 275, 290,
347, 370, 395, 421, 422
Milling Heads, 106, 295
Milling Machines, 8, 9, 11, 30, 35, 69, 81,

98, 179, 187, 215, 300, 417
Milling Machines, Hand, 71
Milling Machines, Horizontal, 98, 108
Milling Machines, Planer Type, 11
Milling Machines, Ram Type, 14, 15
Milling Machines, Tool Room, 108
Milling Machines, Turret, 94
Milling Machines, Vertical, 98, 108, 295, 311
Milling Planers, 11
Mills, 139
Mills, Hollow, 395
Mills, Slab, 299
Motors, Electric, 106
Motors, Gear Head, 423
Mounted Wheels, 292
Mounting Equipment, 396
Mounting Pads, 191
Multi-Drills, 380
Multi-Operation Tools, 174

N

Nibs, Diamond, 417
Notching Equipment, 167, 210
Numbering Heads, 392
Nuts, 420
Nuts, Flanged, 420

O

Oil Groovers, 379

P

Pantographs, 150
Parallels, 404, 415
Parallels, Box, 404, 409, 415
Parallels, Flat, 415
Partitions, Wire Mesh, 436
Pins, 390
Planers, 11
Planers, Milling Type, 11
Plates, Angle, Lapping, Surface, 101, 115, 420
Plates, Steel, 156
Pneumatic Tools, 127
Portable Electric Tools, 193, 440
Presses, Air, 323
Presses, Arbor, 323
Presses, Deep Throat, 363
Presses, Dial Feed, 238
Presses, Foot, 323
Presses, Horn, 363
Presses, Hydraulic, 315, 338, 385
Presses, Punch, 28, 29, 60, 78, 113, 121, 277,
323, 333, 357, 363, 388
Presses, Punch, Hand, 167
Presses, Straightening, 401
Presses, Sub, 400
Profiling Machines, 243
Pumps, Coolant & Lubricant, 301, 423
Pumps, Hand, 423
Pumps, Hydraulic, 423
Punch Press Sets, 420
Punches, 56, 124, 365, 367
Punches and Dies, 356
Punching Equipment, 85, 398
Pyrometers, 404

R

Racks, 390
 Radius Tools, 411
 Reamers, 18, 19, 61, 65, 102, 128, 171, 360, 391
 Reversing Tools, 297
 Reciprocating Tools, 242
 Rectifiers, 41, 261
 Reels, Stock, 72
 Regulators, 83
 Riveting Machines, 385
 Roll Feeds, 298, 327, 375
 Roll Forming Machines, 130
 Rollers, 167
 Router Bits, 422
 Rubber Equipment, 70
 Rules, Steel, 302

S

Saw Blades, Band, 95, 100, 189
 Saw Blades, Hack, Inside Front Cover, 189, 402
 Saw Sharpeners, 383
 Sawing Machines, 95, 366, 385
 Sawing Machines, Band, 68, 95, 214, 323
 Sawing Machines, Cut-off, 214
 Sawing Machines, Friction, 367
 Sawing Machines, Hack, 60, 95, 204
 Sawing Machines, Hole, 95
 Saws, Carbide Tipped, 123
 Saws, Circular, 123
 Saws, Metal Cutting, 214
 Scrap Cutters, 298
 Scrapers, Hand, 401
 Scrapers, Power, 401
 Screw Drivers, Power, 234, 241
 Screw Machines, Automatic, 269
 Screw Sets, 415
 Screws, 420
 Screws, Cap, Set, Socket & Machine, 377, 406,
 420, Inside Back cover
 Segmental Grinding Chucks, 257
 Services: Milling, Grinding, Lapping, Rebuilding,
 Repairing, Business, etc., 51, 170, 337, 346,
 417, 421, 422
 Shapers, 30, 36, 37, 43, 55, 60, 179, 253, 300
 Shapers, Bench, 82
 Shearing Machines, 28, 29, 36, 37, 85, 148, 167,
 323, 367
 Shears, Hand, 354
 Sheet Metal Floaters, 340
 Sheet Metal Machinery, 28, 29
 Sheets, Steel, 156
 Shim Stock, 330, 391
 Shipping Bags, 133
 Sleeves, 354
 Slip Roll Forming Machines, 358
 Slitting Cutters, 123, 354, 395
 Slitting Machinery, 84, 130
 Slotters, 123, 354, 395
 Spacers, 47, 359
 Special Machinery, 47, 69, 101, 160, 201, 370
 Special Tools, 18, 19, 51, 103, 290, 360
 Spherical Washers, 420
 Spindles, 265, 332, 429
 Spring Coilers, 197
 Square Hole Drills, 420
 Squares, Engineers', 361
 Stampings, 330
 Stamps, Steel, 21, 392, 422
 Steel and Steel Stock, 95, 156, 280, 281
 Steel Blue, 408
 Step Blocks, 4, 420
 Step Tools, 380
 Stock Oiler, 298

Stops, Drill, 421
 Stops, Revolving, 297
 Stops, Stock, 297
 Straighteners, 298
 Structurals, 156
 Stud Setters, 117
 Superfinishers, 101, 201
 Surface Finish Standards, 102
 Surface Plates, 75, 116, 147, 169, 285, 415, 420

T

Tap and Drilling Units, Reverse, 405
 Tap Die Holders, 297, 353
 Tap Heads, 405
 Tap Holders, 297
 Tap Sharpeners, 102
 Tap Units, 348
 Tappers, 405
 Tappers, Hand, 400
 Tappers, Automatic Reverse, 405
 Tapping Attachments, 13, 87, 405
 Tapping Heads, 97
 Tapping Machines, 319, 370, 376
 Taps, 13, 18, 19, 65, 117, 131, 417
 T-Bolts, 384
 T-Nut and Stud Sets, 419, 420
 Temperature Indicators, 404
 Test Indicators, 206
 Thinners, Drill Point, 31
 Thread Gages, 32
 Thread Milling Machines, 273
 Thread Rolling Machines, 47, 104, 105
 Threading Machines, 226, 409, 427
 Threading Tools, 104, 105, 318, 405
 Toggle Clamps, 324
 Tool Bits, 395
 Tool Cribs, 436
 Tool Post, Turret, 236
 Tool Posts, 174, 297
 Tote Pans, 421
 Tracer Controlled Equipment, 62, 63
 Traps, Steam and Air, 350
 Triangles, Thread, 32
 Tube Deburring Machines, 226
 Tubing, 156
 Turning Machines, 312, 313
 Turning Tools, 297, 347
 Turret Attachments, 236
 Turrets, Bed, 236
 Turrets, Drill, 351
 Turrets, Lathe, 236, 346, 379
 Turrets, Post, 236, 337, 346
 Turrets, Tailstock, 236

U

Universal Joints, 332

V

V-Blocks, 355
 Valves, 83, 99, 140, 350, 405
 Vises, Air-Powered, 404
 Vises, Jig, 309
 Vises, Bench and Machine, 42, 58, 87, 94, 197,
 204, 233, 288, 324, 339, 381, 398, 412, 420, 421

W

Welding Equipment & Supplies, 89
 Wheel Dressers, 75, 91, 372
 Wipers, Industrial, 61
 Wrenches, Automatic, 386
 Wrenches, Torque, 384

Index to Advertisers

A

Abrasive Associates	257
Abrasive Machine Tool Company	251
Acme Broach Corporation	10
Acme-Danneman Company, Incorporated	420
Acme Industrial Company	371
Acme Tool Company	355
Acme Wire and Iron Works	436
Acromark Company	392
Acro Metal Stamping Company	40
Action Diamond Tool Company	184
Aget-Detroit Company	282-372
Air Conversion Research Corporation	374
Air Transport Equip. Inc.	420
Air-Way Pump and Equipment Company	405
Alco Tool Company	353
Allen Manufacturing Company	Inside Back Cover
American Broach & Machine Company	118
American Drill Bushing Company	48-49
American Machine & Foundry Company	(Wahlstrom Float-Lock Sales Dept.) ... 58
American Pipe Bending Machine Company	389
American Saw & Manufacturing Company	95
American Standard Company	318
Ames Company, B. C.	52
Anderson Bros. Mfg. Co.	401
Anson Manufacturing Corp.	51
Armstrong-Blum Manufacturing Company	Inside Front Cover
Armstrong Brothers Tool Company	4
Aro Equipment Corp.	239
Atlantic Gear Works	234
Atlas Press Company	(Clausing Division) ... 30
Atrax Company	128
Auto Moulding and Manufacturing Co.	415

B

Balas Collet Manufacturing Company	Back Cover
Baldor Electric Company	20
Baldt Anchor Chain & Forge Division	424
Bansbach Machinery Company	311
Barber-Colman Company	172-173
Barker Engineering Company	180
Barry Corporation	396
Bartelt Engineering Company	366
Basco Manufacturing Company	340
Bausch & Lomb Optical Company	289
Bay State Abrasive Products Company	39
Bear Manufacturing Company	334
Behr-Manning Corporation	86
Besly-Weltes Corporation	65
Beverly Shear Manufacturing Company	354
Big Joe Manufacturing Company	114-115
Black Drill Company	310
Blake Company, Edward	102
Blanchard Machine Company	77
Bloomfield Tool Corporation	170-420

B-M-S Carbide Specialties Incorporated	394
Boyar-Schultz Corporation	22
Bradford Machine Tool Company	437
Branch Manufacturing Company	400
Bridgeport Machines Incorporated	94
Brown & Sharpe Manufacturing Co.	16-17
Bryant Chucking Grinder Company	146-147-169-285
Bryant Machinery & Engineering Co.	55
Buckeye Tools Corporation	144
Buffalo Forge Company	85
Bultool Company	316
Busch Company, J. C.	415

C

Cadillac Stamp Company	90
Carboloy Company	344-345
Carborundum Company, The	231
Cedar-West Tool Company Incorporated	366
Chandler Tool Company	416
Chicago-Latrobe Company	103
Chicago Rawhide Manufacturing Company	112
Chicago Screw Company	377
Chicago Tool & Engineering Co.	356
Chicago Wheel & Manufacturing Co.	292
Cimcool Division	(Cincinnati Milling Machine Co.) ... 259
Cincinnati Bickford Tool Company	136
Cincinnati Electrical Tool Company	440
Cincinnati Gilbert Machine Tool Co.	5
Cincinnati Lathe & Tool Company	120-121
Cincinnati Milling Machine Company, Inc. 8-9	
Cincinnati Milling Products Div.	(Cincinnati Milling Machine Co.) ... 228-229
Cincinnati Shaper Company	36-37
Circular Tool Company	123
Clausing Division (Atlas Press Co.)	30
Clemson Brothers, Incorporated	402
Cleveland Crane & Engineering Company	148
Cleveland Punch & Shear Works	124
Cleveland Tapping Machine Co.	319
Colonial Bushings Incorporated	356
Columbus Die-Tool and Machine Co.	337
Comet Tool Company	398
Comtor Company	59
Concentric Tool Corporation	322
Connors & Davis Sales Corporation	197
Continental Machine Company	383
Continental Tool Works	(Division Ex-Cell-O Corporation) ... 271
Conway Clutch Company	431
Cooley Electric Manufacturing Corp.	110
Cosa Corporation	66-67
Covel Mfg. Co.	122
Crane Packing Company	46
Criterion Machine Works	50
Cro-Plate Company	219
Crown Abrasives	417

Crozier Machine Tool Company	337
Crucible Steel Company of America	280-281

D

Dakon Tool & Machine Company	348
Danly Machine Specialties, Incorporated	25
Davis Keyseater Company	385
Dayton Rogers Manufacturing Company	425
Dearborn Company, J. W.	408
Desmond-Stephan Manufacturing Co.	381
Detroit Broach Company	320-321
Detroit Power Screwdriver Company	241
Detroit Stamping Company	335-391-398
Detroit Tap & Tool Company	131
DeWitt Equipment Company	361
Donovan Manufacturing Company	339
Dreis & Krump Manufacturing Co.	380
Dremel Manufacturing Company	193
duMont Corporation	326
Dumore Company	111
Durant Tool Supply Company	298
Duro Metal Products Company	439
Dykem Company	408

E

Economy Tool and Machine Company	382
Edroy Products Company	369
Eisler Engineering Company, Inc.	387
Ekstrom Carlson & Company	422
Electro-Matic Products Company	44
Elgin Tool Works	108
Elox Corporation	370
Enco Manufacturing Company	236-346
Ensis Equipment Company	242
Ex-Cell-O Corporation (Continental Tool Works)	271

F

Fairfield Gauge Company	417
Famco Machine Company	323
Farmington Engineering Company	419
Federal Press Company	238
Federal Products Corporation	2
Felters Company	191
Fen Machine Company	386
Fidelity Chemical Products Corporation	352
Field, Herb M.	409
Fiske Brothers Refining Company	293
Flynn Manufacturing Company	358
Fonda Gage Sales Corporation	183
Forney's Incorporated	413
Fostoria Pressed Steel Corporation	308
Franklin Balmar Company	92-93
(N. A. Strand Division)	
Fray Machine Tool Company	187
Fulmer Company, C. Allen	7

G

Gairing Tool Company	132
Gatco Rotary Bushing Company	227

General Die & Stamping Company	393
Gisholt Machine Company	101-201
Glenzer Company, J. C.	88
Gordon & Morgan Machine Company	160
Gorton Machine Company, George	150
Grainger Incorporated, W. W.	406
Grand Tool & Supply Company	359
Grant Manufacturing and Machine Co.	385
Gray Company, G. A.	11
Greaves Machine Tool Company	35
Greenard Arbor Press Company	385
Greenlee Tool Company	373
Grob Brothers	385
Grobet File Company of America	404

H

Hall Manufacturing Company	400
Halpern & Co., Inc., Wm.	375
Hamilton Tool Company	161
Hammond Machinery Builders	3
Hanchett Magna-Lock Corporation	96
Hanna Engineering Works	181
Hanson-Whitney Company	273
Hartford Special Machinery Company	47
Hartmann Manufacturing Company	288
Heimann Manufacturing Company	415
Heinrich Tools Incorporated	233
Heller Brothers Company	71
Hendey Machine Company	73
Hendley & Whittemore Company	338
Himoff Machine Company	366
Hoggson & Pettis Mfg. Company	422
Horberg Gage Company	107
Horton & Son Company, E.	399
Howe & Fant Incorporated	351
Howald Machine Works, W. T.	370
Huppert Company, K. H.	303

I

Imperial Stamp & Engraving Company	364
Index Machine Company	98
Industrial Diamond Powders Incorporated	424
Industrial Products Suppliers	425
Ingersoll Milling Machine Company	69

J

Jacobs Manufacturing Company	33
J and S Tool Company, Incorporated	42
Jahn Manufacturing Company, B.	237
Jarvis Company, Charles L.	13
Jiffy Manufacturing Company	133
Johnson Bronze Company	202

K

Kalamazoo Tank & Silo Company (Machine Tool Division)	100
Kaufman Manufacturing Co.	378
Kaukauna Machine Corporation	41
Kenco Manufacturing Company	333

Kennametal, Incorporated	422
Kent Machine Company	391
King, Andrew	180
Klaas Machine & Manufacturing Company	357
Kling Brothers Engineering Works	367
Knight Machinery Company, W. B.	1

L

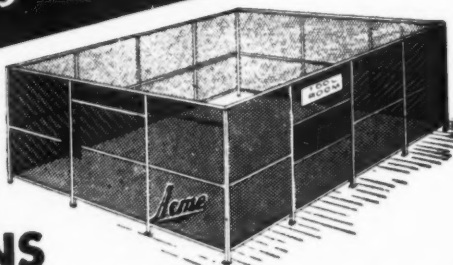
L-W Chuck Company	204
Laminated Shim Company	330
Lapeer Manufacturing Company	324
Last Word Sales Company	288
Lavallee & Ide, Incorporated	64
Leach Machinery Company, H.	249
LeBlond Machine Tool Co., R. K.	138-139
Le Count Tool Works, Incorporated	336
Lee Company, K. O.	225
Lees-Bradner Company	427
Lehigh Foundries Incorporated	62-63
Lehmann Machine Company	119
Levin & Son, Incorporated, Louis	240
Lewthwaite Machine Co., T. H.	356
Linley Brothers Company	407
Lipe-Rollway Corporation	341
Lodding Incorporated	230
Logan Engineering Company	207
Lovejoy Tool Company	290
Lucas & Son, J. L.	421
Lucifer Furnaces Incorporated	232
Lufkin Rule Company	302
Luma Electric Equipment Company	390
Lynn Manufacturing Company	379

M

M.B.I. Export & Import Ltd.	87
M & N Hydraulic Press Company	315
McCrosky Tool Corporation	174
McDonough Manufacturing Company	192
Machine Products Corporation	409
Machine Tool Division (Kalamazoo Tank & Silo Company)	100
Madison-Kipp Corporation	170
Mail Tool Company	234
Manhattan Rubber Division (Raybestos Manhattan Inc.)	70
Marshalltown Manufacturing Company	277
Marshall Steel Company	403
Martin Machine Works, J. E.	421
Marvic Illustrations	422
Master Manufacturing Company	129
Masters	424
Metallizing Engineering Company	125
Michigan Chrome & Chemical Company	384
Michigan Drill Head Company	208
Michigan Tool Company	253
Micro Drill Guide and Engineering Co.	339
Miller Motor Company	80-81
Misal Machinery Incorporated	300
Modern Tool Works	117
Mojave Granite Company	420
Moline Tool Company	370
Monarch Machine Tool Company	312-313
Moore Special Tool Company	91
Morey Machinery Company	411
Morse Twist Drill & Machine Company	18-19
Motch & Merryweather Mchy. Co., The	275

Leaders over 50 years
Established 1899

TOOL CRIBS and PARTITIONS



**Standard Sections Woven Wire Mesh Panels and
Doors to enclose Tool Cribbs, Stock rooms and other
enclosures.**

IMMEDIATE DELIVERY

Write for Catalog

Acme Wire & Iron Works
3519 E. CANFIELD — DETROIT 7, MICH.

Motor Tool Manufacturing Company	410
Mummert-Dixon Company	391
Mutual Machine Company	417

N

National Acme Company	104-105
Nebel Machine Tool Company	176
Nelco Tool Co.	299
New Albany Machine Manufacturing Company	388
New Hermes Engraving Machine Corporation	329
New Method Steel Stamps, Inc.	407
New Plastic Corporation	375
Niagara Machine and Tool Works	28-29
Nichols-Morris Corporation	215
Nicholson and Company, W. H.	350
Nicholson File Company	255
Nielsen, Incorporated	356
Nilsson Gage Company	200
Noble & Westbrook Manufacturing Company	34
Nobur Manufacturing Company	314
Nolan, Edward J.	425
Norgren Company, C. A.	83-384
Northern Tool & Machine Company	338
Northwestern Tool & Engineering Co.	420
Norton Company	75

O

Oliver Instrument Company	31
O'Neil-Irwin Manufacturing Company	167
Osborn Manufacturing Company	54
Ottemiller Company, Wm. H.	406

P

Palley Supply Company	423
P. M. Company	376
Parker Machine Company	179-279-349
Parker Stamp Works	305
Pedrick Tool and Machine Company	126
Pines Engineering Company Inc.	226
Pivct Punch & Die Corporation	56
Plunket Machine Company, J. E.	398
Pope Machinery Corporation	429
Portage Double Quick Tool Company	134
Pratt & Whitney	27
Precision Instrument & Tool Corp.	206
Precision Twist Drill & Machine Co.	76
Preis Engraving Machine Co., H. P.	404
Procurier Safety Chuck Company	97
Producto Machine Company	109
Progressive Welder Sales Company (Viking Division)	89
Putnam Tool Company	152
Pyrometer Instrument Co.	404

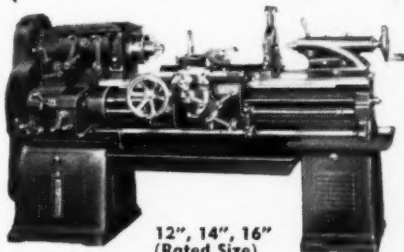
Q

Queen City Machine Tool Company	222
---------------------------------------	-----

You'll Profit from the
Economy and Accuracy of

BRADFORD

Metalmaster Lathes



Engine and Toolroom Lathes

Bradford Metalmaster Geared Head Lathes have earned an enviable reputation through the years for high efficiency and dependable accuracy. Today's new Metalmaster will give you even greater accuracy and economy on your work. Investigate their outstanding features—many of which are found only on lathes considerably higher in price! Write for Bulletin 179.

SPEEDS: 16 rpm. to 1000 rpm.

POWER: 2 hp. to 10 hp.

FEED: .00072 to .1780

THREAD RANGE: 1½ to 368, including 11½ and 27 without extra gearing.

Let a Bradford engineer solve
your lathe problems.



**THE BRADFORD
MACHINE TOOL CO.**

662 EVANS ST.
CINCINNATI, OHIO

Precision Since 1840

R

R and L Tools	297
Raybestos Manhattan Incorporated (Manhattan Rubber Div.)	70
Reading Machine Company	420
Redmer Air Devices Incorporated	325
Rehnberg-Jacobson Manufacturing Co.	348
Reid Brothers' Company, Incorporated	182
Reltool Corporation	395
Richards Company, J. A.	398
Rogers Tool Company, John M.	391
Roll Feeds Corporation	327
Ross Operating Valve Company	140
Rotor Tool Company	127
Rouse & Company, H. B.	74
Royal Oak Tool & Machine Company	57
Rusnok Tool Works	106
Ruthman Machinery Company	301
Rutland Tool Service	360
Ryerson and Son, Incorporated, Joseph T.	156

S

Sales Service Machine Tool Company	60
S & S Machinery Company	84
Schauer Manufacturing Corporation	304
Scherr Company, Inc., George	284-366-420
Schmidt, Incorporated, Geo. T.	21-390
Schrader's Son, A.	99
Schultz & Anderson Company	418
Scientific Lubricants Company	370
Scott Paper Company	61
Seibert and Sons, Incorporated	332
Sellaw Machine Tool Company	396
Service Machine Company	363
Sheffield Corporation	244
Sheldon Machine Company	342
Sid Tool Company	417
Sigourney Tool Company	224
Simonds Saw & Steel Company	189
Smith & Mills Company	55
Somerset Tool Company	411
Sorensen Center-Mikes Inc.	317
South Bend Lathe Works	43-82
Speedgrip Chuck	377
Sperman Metal Specialties	372
Spitfire Tool Company	306
Stadail Manufacturing Company	371
Standard Horsenail Corporation	390
Standard Pressed Steel Company	26
Staples Tool Company	331
Stevens Company, John B.	413
Stone Machinery Company	24
Strand Division, N. A. (Franklin Balmar Corporation)	92-93
Stuart Oil Company, Ltd., D. A.	287
Sturdy Broaching Service	354
Sturtevant Company, P. A.	384
Sun Oil Company	12
Sundstrand Machine Tool Company	116
Sunray Company	414
Suprecision Products	309
Sutton Tool Company	199
Syntro Company	243

T

Tannowitz Works	68
Tatra Tool Company	404
Thomas Hoist Company	419

Thompson Grinder Company	261
Thompson & Son Company, Henry G.	214
Thriftmaster Products Corporation	405
Tietzmann Tool Corp.	419
Torit Manufacturing Company	211
Tree Tool and Die Works	295
Troyke Manufacturing Company	400
Twentieth Century Manufacturing Co.	415

U

United States Drill Head Company	307
Universal Engineering Company	392

V

Van Keuren Company	32
Van Norman Company	14-15
Van Products Company	404
Viking Division (Progressive Welder Sales Company)	89
Viking Tool Company	347
Vimco Manufacturing Company	397
Vogel Tool & Die Corporation	210

W

Wahlstrom Float-Lock Div. (American Machine & Foundry Co.)	58
Waldes-Kohinoor Incorporated	175
Walker Company, O. S.	38
Walls Sales Corporation	412
Walsh Press & Die Company (American Gage & Machine Company)	113
Waltham Machine Works	400
Wardwell Manufacturing Company	383
Warner & Swasey Company	45-269
Watts Brothers Tool Works	420
Welling & Woodard Incorporated	425
Wesson Metal Corporation	23
Wesson Company	79
Western Coating Company	53
West Point Manufacturing Company	384
White Dental Manufacturing Co., S. S.	142
Whitney Metal Tool Company	365
Whitton Manufacturing Company	265
Wicaco Machine Corporation	379
Wiedemann Machine Company	78
Wittek Manufacturing Company	72
Wohnip Engineering Company	422
Woodson Tool Company	414

Y

Yoder Company	130
Yohe Supply Company	390
Yost Manufacturing Company	412

Z

Zagar Tool, Incorporated	399
--------------------------	-----

SOLD TO: INDUSTRY

New 18"

Duro Drill Press Offers You Ruggedness, Accuracy, Modern Design

MORE and more industrial users are turning to this new Duro 18" drill press as the solution to their drilling problems. Massive, heavy, with a large capacity, it is ruggedly built to withstand the wear and abuse of rigorous production drilling. This Duro giant is a "performer"—high speed production drilling operation or intermittent drilling requiring accuracy and precision are handled with equal ease and dependability.

Here are just a few of the many remarkable advantages "built-in" to assure finer quality, greater reliability; and longer "maintenance free" operation: precision ground alloy steel spindle; 4 ball bearings sealed and permanently lubricated; precision bored bearing seats assure perfect alignment; massive close grained head casting eliminates vibration; sturdy cast hinged belt and pulley guard; easily adjustable feed tension with pin for positive positioning; table raising mechanism; with or without foot feed.

Model C3088-18" Drill Press
(Illustrated) Less Motor and Switch

\$248.00



WRITE FOR DETAILS!

Write today for illustrated catalog information giving full details and specifications on this Duro 18" and other Drill Presses

... also brochure on the complete line of Duro precision engineered power tools.



DURO Metal Products Co.
2676 N. Kildare Ave.
Chicago 39, Ill.

Please send me full details on your 18" and other Drill Presses in your line ... plus Brochure showing complete line of power tools.

DURO METAL PRODUCTS CO.
2676 N. KILDARE AVE. • CHICAGO 39, ILL.
Also Makers of Duro Chrome Hand Tools

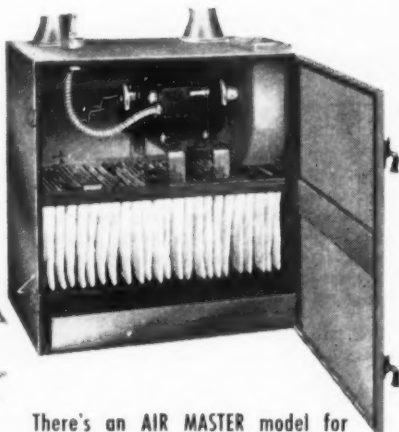
Name.....
Address.....
City..... Zone..... State.....

AIR MASTER Says to Harmful Grit!



Grit is the enemy of costly machines, and of manpower, too. Put a stop to this menace with the AIR MASTER.

Trapped as they leave the wheel of your grinder or buffer, flying particles are filtered out by fabric and steel wool bags. Only grit-free air is discharged. AIR MASTER is self-contained, ruggedly built for long years of trouble-free service.



There's an AIR MASTER model for every grinder and buffer. Give your plant this protection NOW!

Write today! Ask for name of your distributor or Bulletin 53-NB

**THE BEST IN
GRINDERS,
BUFFERS,
DRILLS,
PORTABLE TOOLS**

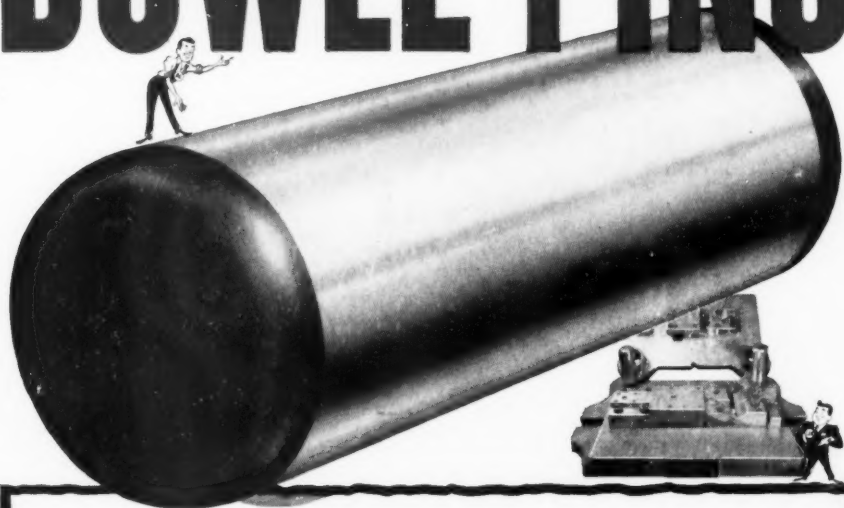
TRADE *The Cincinnati* MARK

THE CINCINNATI ELECTRICAL TOOL CO.

Division of THE R. K. LeBLOND MACHINE TOOL CO.

C I N C I N N A T I 8, O H I O

DOWEL PINS



HOW TO USE THEM

1. Precision Dowel Pins are principally used where parts must be accurately positioned and held in absolute relation to one another whether stationary or in motion. They facilitate quick disassembly and completely accurate re-assembly.
2. Allen Dowel Pins are also used as plug gauges.
3. As plugs for determining angular dimensions of dovetail slides.
4. As hinge and wrist pins in applications requiring initial and permanent accuracy.
5. As accurate, economical roller bearings and axles.
6. As guide pins, stops and position locators.

HOW TO JUDGE THEM

1. *On precision, for low tolerance applications.* (Allen Dowel Pins are ground to a maximum microinch finish of 6 RMS protected by a rust preventive.)
2. *On strength, for shear resistance.* (Allen Dowel Pins are made from special Allenoy Steel, heat treated. Single shear strength measures from 160,000 to 180,000 psi.)
3. *On hardness of surface and a core hard enough to prevent "mushrooming" when driven into a tight hole.* (Allen Dowel Pins have a surface hardness of 62-64 Rockwell C Scale and core hardness of 52-54. Average case depth .010 to .020 depending on size.)

The simple sure way to be sure of uniformly superior dowel pin quality is the same as in buying precision socket screws — get genuine Allens from your Industrial Distributor. Only he sells them but we will welcome your direct request for literature or application engineering assistance.

Available in 108 Standard Sizes from $\frac{1}{8}$ " x $\frac{3}{16}$ " to 1" x 6". Standard tolerance .0002 oversize. Most sizes also standard in .001 oversize for repair work.



THE

Kohinoor

DIAMOND

always stands out among jewels



in

PUSHERS

its

BALAS

For maximum feeding efficiency and reduced stock waste, Balas Pushers and Feed Fingers consistently prove themselves outstanding. Balas Pushers, made in the widest variety of styles and sizes, give you better production at lower unit cost... increased output from both operators and machines. Investigate the advantages of these accurate, dependable Balas Pushers; you will find it profitable to use them on all your screw machines and lathes.



Heavy Duty Cage-Type Pusher

BALAS COLLET MANUFACTURING COMPANY

CLEVELAND 14, OHIO

WORLD'S LARGEST MANUFACTURER OF COLLETS EXCLUSIVELY